THE AMERICAN GAS LIGHT JOURNAL

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXXVIII., No. 20. Whole No. 1,719. | NEW YORK, MONDAY, MAY 18, 1908. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. | THOMAS J. CUNNINGHAM, ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

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[OFFICIAL NOTICE.]

First Annual Meeting, Canadian Gas Association.

OFFICE OF SECRETARY-TREASURER, CANADIAN GAS ASSOCIATION, WOODSTOCK, ONT., May 11th, 1908.

To the Members of the Canadian Gas Association: Gentlemen—The first annual meeting of the Canadian Gas Association will be held in Toronto, Friday, June 19th, 1908. Papers are in the course of preparation and announcement of the titles will be made later. Arrangements are in the hands of an Entertainment Committee for the entertainment of delegates, outside of the business meetings. There will be trips of interest, including a visit to the large, modern plant of the Consumers Gas Company, and to various points in the city. The business meeting will be held in the King Edward Hotel. It is suggested that reservations be made at as early a date as possible. Please advise me if you expect to be present. Yours very truly,

A. W. MOORE, Secretary-Treasurer.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

To the Members of the American Gas Institute: All members of the Institute are earnestly requested to send in as soon as possible contributions for this year's Wrinkle Department report. The success of the Department depends entirely on the co-operation and assistance of the members.

Mail all contributions to Milan R. Bump, Editor, No. 60 Wall street, New York city.

[NOTICE.]

Third Annual Meeting, Natural Gas Association of America.

OFFICE OF THE SECRETARY, KANSAS CITY, MO., April 6, 1908.

To the Members, Natural Gas Association of America: Gentlemen—The third annual meeting of the Natural Gas Association of America will be held in Kansas City, Tuesday, Wednesday and Thursday, May 19th, 20th and 21st. The following papers will be read:

"Geology Relative to Natural Gas," by Mr. F. H. Oliphant.

"Transportation of Natural Gas," by Mr. Wm. M. Welsh, Chief Engineer Kansas Natural Gas Company, Independence, Kas.

"Method of Distribution Management," by Mr. James Strickler, City Superintendent, Columbus, O.

"Field Operation," by Mr. Walter McClay, General Superintendent, Philadelphia Company, Pittsburgh, Pa.

"Methods of Accounting," by Mr. W. R. Hadley, Pittsburgh, Pa.

"Installation of Distribution Systems," by Mr. John B. Klumpp, U. G. I. Company, Philadelphia, Pa.

Other papers, the Question Box and Wrinkles, are in the course of preparation, and announcement of the titles of the papers will be made later.

For the entertainment of the delegates outside of the business meetings, arrangements are in the hands of an Entertainment Committee for visits to various parts of this very interesting city, and for a banquet on Thursday night. There will also be trips of interest; and a theater party for the ladies. The business meetings and the banquet will be held on the roof garden of this hotel. It is suggested that reservations for rooms be made at as early a date as possible.

It has also been determined to take the entire ground floor of a building immediately south of the Savoy Hotel, which will be the headquarters of the Association for the purpose of demonstrating various appliances for using natural gas.

This room is large, well lighted, well ventilated and readily accessible, not only to the members of the Association, but also to the public. As the building is piped the various appliances exhibited can be shown in actual operation. Manufacturers of appliances wishing to make a demonstration thereof may obtain any necessary or desired information concerning this display by applying to Mr. R. O. Fritz, 2012 Baltimore avenue, Kansas City, Mo. Yours very truly,

J. H. DUNKEL, Secretary.

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BRIEFLY TOLD.

THE EL PASO MEETING, SOUTHWESTERN GAS AND ELECTRICAL ASSOCIATION.[1]—"The El Paso meeting of this Association was successfully brought off in that city on the 7th, 8th and 9th insts. The proceedings were directed by the President, Mr. H. T. Edgar, aided by the Secretary, Mr. R. B. Stichter, and the comfort and entertainment of those who participated in the meeting, during and between the business sessions, were successfully handled by an entertainment committee who surely were entitled to the hearty vote of thanks tendered them just prior to final adjournment. The weather conditions were good, the attendance (not far from 150) was excellent, the proceedings were interesting, useful and unprolix. The first session was called promptly at 10 A.M. of the 7th in the dining room of the St. Regis Hotel, which comfortable abiding place was also the headquarters. An especially clever address of welcome was made by the Hon. James W. Sweeney, Mayor of El Paso, and the response thereto (by Mr. H. S. Cooper, of Galveston) was really not in second place to the Mayor's welcoming words. A lengthy list of applications for membership (36 in fact) having been favorably acted upon, and an explanation made as to the lack of a set of minutes of the last meetimg (the minutes had unfortunately been lost in a fire that destroyed the office of the stenographer who reported the 1907 meeting), President Edgar read the annual address, which was an able document all through, but which was especially notable for its presentation of certain general legislative matters agitated in the twelvemonth which had close connection with the operation of public utilities in Texas. The address also contained much that affected the working of the Association, *per se*. The first paper read was that prepared by Mr. Mark Lowd, of Dallas, the theme of which was "Track Construction." In the author's absence the paper was read by Mr. C. H. Ladd. The afternoon proceedings included an excellent paper by Mr. J. A. Myler, Manager of the Dallas Gas Company, on the old-new story of "Testing and Proving Gas Meters. He was rewarded by a lively discussion of the ways and means that his sentences brought to mind. In the afternoon the session was started by a lively discussion on the query as to "What Policy should be Pursued by Public Service Corporations in Making Extensions?" The Question Box next came in for consideration. It held a wealth of matter that brought out profitable speeches, notably in respect of the calorific value of oil and the best way of using it as fuel. Turbine engines also came in for a right good share of attention. The Question Box matter was so good that Editor Samuel Kahn was forced to succeed himself as man-in-charge thereof. The opening number of the second day was the paper by Mr. W. B. Tuttle, of San Antonio, on "Gas Producers and Gas Engines." It was altogether too bad that the author could not attend the meeting; but the paragraphs (and pointed ones in it were many) were well spoken by Mr. Kahn. No discussion was had on the paper, which was regrettable on many accounts. The "star" paper, if one might judge from the applause handed out to the preparer, came next in order. It was by Dr. E. P. Schoch, of the University of Texas, and it treated of "Wood Preserving." There is little doubt that it will become a sort of reference treatise on this subject, which has meant much to to the Southwest for years, and which will mean more unfortunately to other sections of the States in the nigh years to come. Another try at the Question Box, and then followed the session of the Supply Men, whose brisk and enjoyable thought transferences were freely stimulated from the President's desk by that clever "Knight of the Road," the only "Sam." Hobson, of St. Louis. The curtains of night were to a certainty drawn back by the Rejuvenated Sons of Jove in their festivities for and during Friday night. But 'tis too far back a cry now to attempt a description of the doings—they were all to the good seems enough to write here. It should have been said a trifle above that Dr. Schoch was wisely and unanimously elected to Honorary Membership. The last day's business from a technical standpoint was an excellent paper, by Mr. C. W. Kellogg, Jr., of El Paso, on "Various Forms of Electric Illuminants and their Efficiency." The discussion of its tenets was a lively one, and was confined to extremely practical lines that may be of quite some use to you Eastern folks. Another thing of interest that transpired was an excellent address on association work, made by Mr. B. V. Swenson, Secretary of the American Street and Interurban Railway Association. He hails from New York, and travelled all the way to meet with us. General business, of a routine nature, next came to hand, then the election for officers, which resulted thus:

President—R. B. Stichter.
First Vice-President—W. B. Tuttle.
Second Vice-President—W. B. Head.
Third Vice-President—Jos. E. Carroll.
Secretary—J. A. Myler.
Treasurer—A. E. Judge.

1. Special Editorial Correspondence.

Of course, there was much more of value done at the meeting than this hurried synopsis can even suggest, but enough has been given, we believe, to prove that the El Paso convention cannot fail to be productive of good results to the industries which were there represented.—M.—K."

[No. I.]

Review of the Twenty-third Annual Report, Board of Gas and Electric Light Commissioners, Commonwealth of Massachusetts.

[Prepared for the JOURNAL by MR. H. THURSTON OWENS.]

Massachusetts is one of the original 13 States. It has an area of 8,315 square miles and a population of nearly 3,000,000. It is well-known to the world as one of the most important manufacturing centers in the country, and is justly considered a home of tuition of the highest sort, in support of which it is noted that its capital, Boston, is the fifth city in the United States in size, having a population of over 600,000, and where the amount devoted to education is greater than expended in St. Louis and Baltimore combined, and over half that of Chicago, with a population over three times that of Boston. Within the State are two cities having 100,000 population, 7 with over 50,000, and 9 with over 30,000.

It was the first State to adopt the commission method of supervising its gas and electric corporations, and its example has been followed by others, notably by New York and Wisconsin.

The present Twenty-third Volume of the Commission's statistics contains nearly 500 pages, which are valuable principally because a system of uniform accounting is enforced. The companies and plants under the supervision of the Board are divided as follows:

Companies.				Municipal Plants.			
Gas.	Electric.	Comb.	Total.	Gas.	Electric.	Comb.	Total.
50	68	25	143	None	17	4	21

During the year one electric company was disbanded while three new electric companies began to supply current. One of the principal arguments brought forward in favor of the government by commission is that wasteful competition will be prevented, thereby conserving the interest of consumer and company alike.

This appears to have been borne out by the facts, for an application for permission for a new company to enter a district, already supplied at a reasonable price, was refused. Whereas permission was granted in a case where the existing company refused to lower the rates in force.

Practically all of the petitions for new stocks and bonds were approved, as the amount asked for was $4,751,000, and of this $4,384,500 was approved, being an increase of $1,548,000 over 1906. This amount was divided among 23 companies, one-third of the requests being granted during the worst period of our recent severe financial disturbance.

The fact that gas consumers receive greater protection under the existing laws than electric light consumers is very forcibly demonstrated in this report. The law covering the testing of electric meters has been in force since 1901, and the *grand total* of meters inspected to date amounts to 224; of this number 29 were inspected during 1907, at an expense to the State of $181.19.

The gas meters inspected during the year number 59,475; the average fee charged is slightly over 25 cents, so that the income was $15,138.90. The expenses amounted to $11,133.54, leaving a balance of $4,005.36. The number of meters tested upon complaint of consumer is one-third of the number tested in 1903.

No examinations are made as to the voltage carried or the efficiency of the lamps supplied by the electric companies, but there were 977 inspections made to ascertain if the legal standard of 16-candle power gas was complied with. In 31 instances the readings were lower than this figure; but, with one exception, the average was over 16-candle power and the average in 9 cities was over 20.

Regarding impurities, the law states that the gas shall contain not more than 20 grains of sulphur or 10 grains of ammonia and no sulphuretted hydrogen, and these provisions have not been complied with as satisfactorily as have been the provisions as to candle power.

Comparing the results of 1907 with 1903, we find that the number of companies showing a deficiency in candle power has decreased from 37 to 18, the highest candle power has increased from 26.7 to 27.8; the lowest remains the same, namely, 12.4, while the average has increased from 17.91 to 18.14. The number showing sulphuretted hydrogen has been cut in half, the 1903 figure being 20, while the figures regarding companies showing excess of sulphur and of ammonia remain substantially the same, 28 and 9 respectively.

Comparing the requirements of the Public Service Commission, Second District, State of New York, and the results in Massachusetts as to candle power, we find that the gas of each kind is of higher candle power than is required in its sister State:

	Candle Power, N. Y. State.	Candle Power, Massachusetts, 1 07.
Coal gas	16	17.01
Mixed coal and water gas	18	18.23
Water gas	20	20.61

The importance of legal requirements as to quality and purity is well illustrated by the conditions in London to-day. The requirements called for no more than 17 grains of sulphur per 100 feet, but these restrictions have been removed and a leading authority has stated that 35 grains per 100 feet is considerably exceeded.

[Official Report.—Continued from Page 799.]

FOURTH ANNUAL MEETING, ILLINOIS GAS ASSOCIATION.

Held in the Auditorium Hotel, Chicago, March 25 and 26, 1908.

Second Day—Closing Session.

The closing session of the convention was called to order by President Eustace, at 10 A.M., March 26th.

An Invitation.

The President—Before proceeding with the regular order of business, I wish to say that a most cordial invitation is extended the members of the Association and their friends to visit any of the plants of the Peoples Gas Light and Coke Company. Many of the Superintendents and their assistants are present, and they would be very glad to escort any delegations that may wish to take advantage of this opportunity. Next in order is the

Report of Committee on Place of Next Meeting.

Mr. H. L. Rice, on behalf of the Committee, reported as follows:

Gentlemen: Your Committee canvassed the situation very carefully. The Association now numbers about 125 active members and, with the associate members we shall add to our rolls, we may confidently predict that we will have a membership next year at our annual meeting approximating 200 or more members. Now, with such a membership, there is only one city in Illinois that can house and care for the Association properly, and that is Chicago. The Committee decided to recommend Chicago as the place of next annual meeting. We have taken cognizance of the fact that the Wisconsin Gas Association meets every year at Milwaukee, and that the New England Association meets every year at Boston, so there is a precedent for our meeting at the same place for a consecutive number of years, and we offer Chicago as our recommendation.

The President—Gentlemen, you have heard the report. What is your pleasure?

Mr. Persons—In view of the fact that every gas man in the State likes to, and does come to Chicago once or twice a year, I would suggest that the Committee report Chicago as a permanent place of meeting. I believe we should adopt the same plan followed by the New England Association in having a permanent place of meeting. This Association has grown to such proportions that you cannot be taken care of in any other city in the State, so why not name Chicago as a permanent place of meeting?

The President—Do you make that in the form of a motion?

Mr. Persons—No, sir; I hadn't said much, and I just wanted to talk some. [Laughter.]

The President—Mr. Persons, I think it is perfectly proper for you to put that in the form of a motion.

Mr. Persons—I will make such a motion, then. [Whereupon the motion, as proposed by Mr. Persons, and seconded by Mr. Howard, was submitted to a vote of the convention and same carried unanimously.]

Mr. Z. T. F. Runner submitted the following

Report from the Committee on Nominations:

To the President and Members of the Illinois Gas Association—Your Committee on Nominations begs to submit the following report:

For President—Mr. H. L. Rice.
For Vice-President—Mr. C. H. Quackenbush.
For Secretary-Treasurer—Mr. C. B. Strohn.
For Executive Committee—Messrs. W. R. Rhoades, H. S. Whipple, Irwin Rew, C. L. Day and G. S. Goodnow.
Member, Board of Directors, American Gas Institute—Mr. J. H. Eustace.

Z. T. F. Runner,
J. B. Howard,
G. F. Goodnow,
} Committee.

The President—With reference to the officers for the ensuing year, I would like to have our worthy Vice-President, Mr. Runner, assume the Chair.

Election of Officers.

The Vice-President—Gentlemen, you have heard the report of the Committee. What is your pleasure?

Mr. Persons—I move that the convention as a whole cast its vote for the adoption of the report of the committee as read. The motion was duly seconded and unanimously carried amidst applause.

The President—We would like to hear something from Mr. Rice, our newly elected President.

Mr. Rice—Gentlemen, I appreciate your action very highly. It is a great honor and a great pleasure to be President of the Illinois Gas Association. I also appreciate the responsibility of the position and the high standard that has been set by our present honored executive. I thank you sincerely, and I can only say that I shall do my best and endeavor to be worthy of the honor you have conferred upon me. [Applause.]

The President—We would like also to hear from our Vice-President, Mr. Quackenbush.

Mr. Quackenbush—Gentlemen, I do not know that there is a great deal to say, only to thank you very heartily for the honor conferred upon me. I trust that the office of Vice-President will be an active one, and that the Vice-President will be able to be of material assistance to the Association. I thank you. [Applause.]

The President—We would also like to have a few remarks from our newly elected Secretary, Mr. Strohn.

Mr. Strohn—Mr. President and Members of the Association: It is needless to say that I thoroughly appreciate this honor, and also the work that goes with the position. I have been associated somewhat with our last Secretary, Mr. Robb, and thus I realize what the duties of a Secretary are. I only hope that the affairs of the Association will be conducted in the future as successfully as they have been in the past. [Applause.]

The President—We would like to hear from Mr. C. L. Day, one of our newly elected members of the Executive Committee.

Mr. Day—Gentlemen, I appreciate the honor very much. I do not know why, with all of the brilliant talent about me, that you have picked me out, but, like the rest of the gentlemen, I shall try to do what I can to better the interests of the Association. I thank you very much. [Applause.]

The Vice-President—Mr. President, I think the members of the Illinois Gas Association would like to hear from the man they have elected to represent us on the Directorate of the American Gas Institute. [Applause.]

The President—Gentlemen of the Illinois Gas Association: I am deeply sensible of the honor you have conferred upon me by electing me as your representative to the American Gas Institute. It is a very distinguished honor, and I wish I felt I should be able to meet the duties of that office as thoroughly as they should be met. I can assure you my heart is in the work and I shall do my very best to render capable service, and thank you very heartily. [Applause.]

Electing Mr. J. B. Howard to Honorary Membership.

Mr. Persons—Mr. President, I do not know whether I have the right to do so or not, but I would like to make a motion. The Illinois Gas Association has honored itself in the election of officers. It has honored itself in electing a Director for the American Gas Institute. There remains, however, one very great honor this body can do itself, and an honor that will be appreciated not only by every gas man in Illinois, but beyond the borders of the State and throughout the United States. I want to suggest that having elected our officers, that we now elect "Uncle Jerry" Howard an honorary member, and confine the honorary membership to one. I make that as a motion.

Mr. Pratt—I wish to heartily second that motion.

Mr. Persons—I do not wish to occupy more time than I should, but I have this to say. "Uncle Jerry" has been active and prominent in the gas business for as many years as I am old—I won't tell you how long that has been. We owe it to ourselves to confine the honorary membership to one, and I think we should elect "Uncle Jerry" as that single representative.

Mr. Pratt—I call for a standing vote. [This motion was then put to a standing vote and carried unanimously, amidst great applause.]

Mr. Howard—Mr. President, and members of the Illinois Gas Association: I do not know what to say. I am too full of appreciation. I can only say that I appreciate this high honor, and the few years I have yet to live will likely be lengthened by your action. Perhaps this will carry me a few years longer than I thought for. I thank you heartily and hope that every member of the Illinois Gas Association will live to the years of your "Uncle Jerry." [Applause.]

The President—There being nothing further under the head of new business, we will listen to the paper by Mr. C. L. Day on

METER SHOP REPAIR PRACTICE.

[For the text of the paper by Mr. Day, see Journal, April 27, 1908, page 713.]

Discussion.

The President—Gentlemen, I trust we will have a full discussion on this very excellent paper. I will ask Mr. Strohn to lead off.

Mr. Strohn—After one has read a few lines of Mr. Day's paper he is convinced that the practices therein described are such as are followed out in the meter shops of a very large company. We who have small shops cannot afford some of the conveniences such as he mentions. I note especially the exhaust fan for carrying away the odors; the electric fire alarm system, along with its weekly fire drill; also, the compressed air for doing away with the old and laborious practice of raising the prover holder by hand. This subject has been thoroughly treated and one finds it difficult to point out any weaknesses in the paper. Most anything further that I might say will be in the nature of questions. I should like to ask why a cement floor in the shop proper would not be preferable to a hardwood floor? It is stated that, in the stripping room, the drain should not be connected to the city sewer, provision being made to dispose of all condensation or scrubbing water, etc., by other means. What are these other means? Is the water run into a special cesspool, or is it drained into cans or barrels? Under the head of Bench Work, Class 1, Mr. Day states that meters that have to be repaired, regardless of test, are those which are over 2 years old and have not been repaired within that time. Possibly I am a trifle slow in comprehending the meaning of this sentence. Many meters have been repaired, regardless of test, that were less than 2 years old, and many have to be repaired, regardless of test, that are more than 2 years old. Possibly Mr. Day has purposely omitted the description of the different tools, appliances, wrinkles, etc., employed in his meter shop practice. I think such descriptions, along with the set of rules which he requires his repair men and test men to follow, would have been decidedly valuable in connection with this paper. If I am not mistaken the meters in Chicago are subjected to a test by a city meter inspector. I am especially interested in this matter, as in the city where I live an ordinance has recently been passed providing for the inspection of all meters before they are installed. I would like to ask how the meters are placed in the hands of the city officials? What kind of inspection certificates are used, and whether or not the gas company is placed to any inconvenience or extra expense due to this municipal inspection? I wish to say, in closing, that I consider this paper a valuable contribution to the gas fraternity, and, as was suggested, when the paper on "Retort House Practice" was read, I submit that every employee connected with the meter shop should be obliged to familiarize himself with Mr. Day's article on "Meter Shop Practice."

The President—I think we have Mr. B. H. Spangenberg with us, and we would like to hear from him on this subject.

Mr. Spangenberg—I do not know that I can say very much, Mr. President, inasmuch as I did not know until yesterday that a paper of this sort was going to be read to day. However, I am under the impression that Mr. Day's paper refers to quite a large shop. At least that is the way I interpret it. It is along the lines of a large shop that I was handling in the East. Coming down to smaller shops, I do not believe that it would pay at all to put in an appliance to keep pure air in the room; that is, not to the extent of putting in an exhaust. In a small shop I was running, over the meter outlet, as the meter was being tested, we had a 4-inch pipe, a vertical telescopic tin pipe, that would slide up and down, with a funnel at the lower end, and we put the funnel right over the end of the outlet side of the meter being tested, and the pipe was connected with a "Star" ventilator in the roof. There were series of those pipes, and we had absolutely no odor in the room. When it comes to the question of stripping meters in a large shop, it certainly would not pay to partition off small rooms; that is, if you wanted to handle your work rapidly and economically. Experience in the past has proven that. This large shop referred to was first divided originally up into a number of small rooms. The shop was 60 feet wide and 300 feet long, and inasmuch as it was divided up into those small rooms, one man could not see what the other man was doing, and the foreman could not see what the men were doing. Not only that, but it interfered with the quick movement of the meters through the shop. In moving meters along through the shop we used trucks. I don't know whether I am going into more detail than you want or not, but I will proceed. We used trucks that had three shelves, with a space between them that would accommodate 10-light meters. For the larger meters we had special trucks. By the use of these trucks we were able to shove the meters through the shop at very rapid speed. Referring to the matter of corking up meters taken from service, we found that it was very much more economical and satisfactory to use a tin cap, with a screw, just the same as is used on the top of a bottle. This is probably common practice now. I do not know whether it is or not, but we found it very much cheaper than corks, and very much more satisfactory. A point not touched on in Mr. Day's paper is the storing of condensation that is drained from the meters. This is very inflammable stuff and it should be stored in safety cans. We designed a special form of can, which was nothing but a 5-gallon paint can with a 4-inch opening on the top and provided with a 4-inch slip cover. Through the center of the cover we ran a ¼-inch drain pipe with a funnel on the top, down to within about ½ an inch of the bottom of the can, and all condensation was poured into these cans. Of course, the vaporizing that would take place would only be equal to the area of the small pipe. Regarding the handling of meters that are ready to go to the consumer, or that are coming in, I will say that we use pads. Just a small pad about 14 inches square and 1-inch thick, made of felt, canvas covered. We also lined the sides of the van with pads of an equal thickness, and very great care was taken to prevent jarring of the meters, or any chance of the meters rubbing against each other in the vans, and we believe that we saved a lot of money by doing so. Another thing we found very valuable was to keep a card record of the location and probable cause of meter leaks. Every meter that came out of service had a separate leak card made out by the fitter. The meter was afterward inspected in the meter shop and further information was filled in on the leak card showing the exact cause of all leaks in meters, whether from rust or a split joint, or whatever else. We derived very valuable information from that and were able to reduce our meter leaks by a very large percentage. Another thing that we found valuable in the small shop, or the district shops, as we called them, was to have a chart framed right in the room, so that every man there knew just what step to take in putting the meter through the shop. Some meters would follow one course, and other meters would follow another course, but, starting with the testing of the meter, there was a separate line of travel laid out for each one, and that chart saved a lot of time and prevented the men taking the wrong step in carrying the meter through to the completion of the work. We also used this to great advantage in the large meter repair shops, but instead of using the chart we used a card system. One card referred to another card, and a man could easily follow the cards through. It showed just what should be done with each individual meter as trouble developed. I do not know whether there has been any trouble in the West here due to the use of Texas oil or not, but in the East there has been a great deal of trouble caused by its use, which after at least 18 months of careful investigation we found was the reason for bleached diaphragms. The Texas oil is a good gas maker, gives a good candle power, but it carries along a lot of light benzoles, and this was covered in Mr. J. M. Rusby's paper of last year. At any rate, after very many months of investigation, we found that the oil originally in the diaphragm could be washed out over night by a reduction in temperature of not more than 10°, and the diaphragms would be left without any oil in them. They would then become wet with water condensation from the gas. The temperature in the cellar would then rise, and the water be driven out, and the first thing we knew we had a bleached diaphragm. If this bleaching process continued long enough the diaphragm would crack. The method we used to overcome that was to put a certain amount of neutral machine oil in the bottom of the meters allowing the diaphragms to just dip in this oil, the diaphragms oiling themselves by capillary attraction. If any gentleman present wishes to know more about the details of this matter I will be glad to talk to him after the meeting. I will not take more of your time at present to discuss fully this matter, but I will say in closing that I believe eventually every dry meter in use in this country will have automatically oiled diaphragms, because that is the life of the meter.

The President—We would like to ask Mr. Goodnow to join in the discussion of this paper.

Mr. Goodnow—This paper brought up one or two questions which remind me of the hearing before the Wisconsin Railroad Commission a short time ago, at which I was present. This Railway Commission has authority over all of the public utility corporations in Wisconsin, and there was a discussion had for the purpose of giving information to that Commission, and the gas men of Wisconsin and others outside the State would do well to get the report of that Commission. They had a verbatim report of the discussion, and I think this Commission would furnish copies of that report upon request. The question of standard of meters and the matters of testing, and a great many other matters in regard to handling meters from the consumer's point of

view, or the business point of view, were brought out, but the standard established, or the standard which will be established, has not yet appeared. No doubt, however, it will appear and the standard will be established by this Commission for the governing of the operation, testing and proving of meters in Wisconsin, and I think no doubt it will be used if other States appoint commissions, especially in the West. Therefore, it is of very great interest to us in Illinois or those of us in the neighboring States. The discussion there was familiar to gas men, as well as the application of the standard adopted by this Commission. One or two points in Mr. Day's paper I would like to ask about. I wish to know their practice, whether that in the final proving of meters they use air or gas. That was quite an elaborate part of the discussion at Madison, and I would also ask how often a periodical test of all meters is made by the People's Company. They mentioned two years, but I do not understand whether that is the practice – that is, to prove or test the meters every two years. Another interesting point in a larger city, which will interest smaller companies a good deal, is to know how meters are punctured or made to fraudulently register. What means are found and how the meters have been changed so as to register less, or not at all. That would be an interesting point which Mr. Day does not mention.

The President – Are there any others who would like to join in the discussion? Are there any who wish to ask any questions of Mr. Day?

Mr. Persons – If Mr. Day is going to tell this I think we had better excuse the stenographer. In traveling, I see nearly almost every day different manners of robbing a meter; that is a most common thing we all know; but the way meters are punctured I do not think we should advertise very much. I think Mr. Day has gone into the practice of meter shops very carefully, and I would like to hear a paper next year from him, or some of his lieutenants, on the subject of taking a meter from the shop to where it is set, and the result of the different conditions, different places, different temperatures and different degrees of dampness and all that. I think that would be a very interesting subject to us all.

Mr. Battin – I would like to ask whether the statement that meters had to be repaired, regardless of test, every 2 years, means every meter that has not been in the shop and actually taken apart and repaired within 2 years must be repaired? It would seem that would make the repairs very much greater than any I have been accustomed to finding, and in the case of small plants, in a small town of 100,000 or more, it would involve a large shop. My experience has been that, even in towns of that size, the number of meters necessary to do anything with, other than the ordinary adjustment for error in registration, it was cheaper in the long run to send them to the meter repair shops rather than to have any equipment at all for making repairs yourself.

Mr. Parker – I would like to ask the gentleman the questions – he speaks of meters that are condemned and those that bear the old number – whether he gives them a new number or not. Does he give a different number when he places a meter, or does he just use the same number of the meter that was destroyed? I suppose, however, that these papers will be printed and all of this discussion will appear in pamphlet form.

The President – They will all be printed in pamphlet form and will be distributed.

Mr. Cowdery—I have not heard all of this discussion, Mr. President, and I would just like to ask a question as to whether the point had been brought out against the frequent change of meters. I think it is quite natural for the gentleman to believe that meters should be changed frequently, and that after they have had a certain number of years of life that a change would be justified; but in my experience I have found it necessary to reverse my opinion in the last few years. I believe that, under any reasonable, ordinary, conditions the meter is better off if let alone. I think the greatest irregularity about a meter takes place the first 6 months after it is set, whether it is a new meter or a repaired meter. I think that is more particularly the case with a new meter, until it gets saturated with the gases and brought down to its regular working condition, and under any reasonable, ordinary conditions; that is, where the conditions are not extraordinary, I think a meter continues to give good service through quite a number of years. I do not believe any of us know what that number of years is, but I think 5 years is certainly a short enough time, and I am quite inclined to think 10 years is better. Therefore, I am strongly against the frequent changing the meters, and I believe that those who have given this a very careful study, and devoted a great deal of watchfulness to this question, will come to the same conclusion.

Mr. Rice – Elaborating on that same thought, I would call attention to the advantage of locking meters that are temporarily put out of service. In some localities, especially in flats or apartments, the moving of tenants is frequent and the meters serving these tenants go temporarily out of commission. Also, in spite of all efforts, the use of gas ceases in some houses through the winter months. These and other causes contribute to the temporary removal of meters unless the system of locking meters is introduced. Now, the removal of a meter is the worst thing that can happen to it unless this removal is absolutely called for by necessary repairs. Notwithstanding all the precautions we can bring to bear - careful training of fitters, padded boxes, good wagon springs, straps, and all that sort of thing—injury to the meter is extremely probable. It costs money, too. Many of you who have figured out what it costs to take down and put up a meter know it is a considerable item, much exceeding the cost of locking a meter in service. Of course, if meters are allowed to stay locked too long they will be injured through lack of use, but at least 75 per cent. of unnecessary changes can be avoided. Our Company found it a good thing not to take down meters unless absolutely necessary. We lock all the meters that we can and safeguard against leaving them out of use too long by going through our ledgers every month. A meter that has remained locked 4 months, with no immediate prospect of unlocking, is taken down and brought in.

Mr. Negley – A word in reference to Mr. Rice's statement. We find where a stove is discontinued, or rather where it is taken out of a building entirely, that it is better practice to remove the meter and take it to the shop than to leave it in the house until someone else moved in. We found a number of cases where we left the meter installed an indefinite period, expecting some one to move in. However, we find it better practice to disconnect the meter and bring it in, then if at some future time a party wants a stove set we install a new meter. In that way we keep the dead meters in the shop, and we have none of these meters out in the city. For my part I believe it is a better plan to bring the meters in, unless they are actually connected with the stove, or with lights.

Mr. Quackenbush – I would like to ask Mr. Rice, with regard to leaving the meter in service locked, how many prepayment meters he has?

Mr. Rice—We have only a small proportion of prepayment meters, and do not leave these meters out when not in use.

The President—If there are no others who care to join in the discussion I will ask Mr. Day to close.

Mr. Day – A cement floor is hard on the feet; and if you keep men at work on such a floor you are going to have difficulties until you put down a wooden one. As to drains and cans, I think that can idea is a very good one. If the condensation runs from the drain into a sewer, you are apt to get a report of a leak 2 or 3 blocks off, and are liable to tear up an asphalt street to locate it, and then you may perhaps find the trouble is from your meter shop. The matter of meters coming in and requiring repairs, or being repaired when they have been out 2 years or over, I think might have been made clearer in my paper. These meters are not brought in for age, but for other causes. I believe the practice exists among some companies of taking the proof of the meter as the evidence of condition; that is, if a meter comes in that has been set out under active conditions for 2 years or less and proves correct, it is painted and reset without further examination. The aim of our shop above all is to see that no meter goes out unless it is absolutely known to be in perfect condition. When a meter comes in that has been setting but a short time, no matter what the prover shows, we open it up and examine it to see if it is clean, if the diaphragms are in good shape, and if everything about it is right, and when it goes out we can say that it is practically as good a meter as it was when first put out. A meter may be found only a little dirty or a diaphragm needing a little oiling or a few trivial things that are necessary to be done; but every meter that has been out 2 years or so, when it comes in it is opened and gets whatever repairs are found necessary. As to tools. Most of our men make their own tools. If you want to create riot in the meter shop take away their tools or let one man take another man's tools, or give a man a kit of tools and tell him he should use only those. Almost every man at the bench has special tools for special purposes, generally some tool that he thinks will do a little bit better work in packing a box than any other tool you can give him. I find that most of the tools the men use are those made by themselves, notwithstanding the fact that they are furnished with a complete outfit by the shop. Regarding city inspection, we have, I think, 3 city inspectors at our large shops, who are given a place by themselves. They get the meters in batches. After the

meters have passed all repairs, proving, testing and painting and are ready to go out, they are sent to the City Inspectors to be put through their test, and if found not to be 100 they are sent back. It is our aim to send meters out on the "100," and unless they show that test they are rejected by the City Inspectors and sent back for readjustment. If found correct, a certificate to that effect is pasted on the meter, giving name of inspector and date of inspection. They are then ready to be set. Under the city ordinance we pay the inspectors, and every meter goes through their hands before it goes out to be set. I did not mention in the paper, but we use a hose on outlets of meters when being tested to carry off the old gases. I think it is a very good practice. Our aim in the shop is to preserve the health of the men. Unless you take pains to get rid of the gases and smoke, your men will suffer. We find, however, that in taking care to see they are getting good air we certainly increase the amount of work they can do. Take a man who is half sick and loggy, not working on piecework, but paid by the day, as is the practice in our shop, and you can easily see his output running down. We use large trucks to convey meters to-and-fro in the shop. We use tin caps on all meters in stock. When meters are removed the fitter puts tin caps on the tubes. These caps are similar to those used on tomato catsup bottles. We find they answer every purpose and are a great improvement over the old corks. Mention was made of a leak record. We do not keep this at the shop, but we have at the main office a file in which is put all complaints, and the meter complaints go onto that file. The file is very carefully worked through to find out from the reports on the tickets (the ticket itself being the file) just what the complaint was. We take a month's meter complaints, tickets which show kinked connections, leaks at seams, leaks at bottoms, leaks at dials, and all the other things that happen to a meter. These are separated and classified, so that in getting this information we can put our finger on the trouble and know just how much of it we have in that stated time. Now, to get at the cause of the trouble. I took a foreman out at the shop and said to him: "I am not satisfied with the information I am getting from this file absolutely. I find out what the trouble is; but what are the causes for it? Why do we have leaks at meters? Is it poor repairing? Is it poor, new meters? Are the meters ill treated on the wagons? Do we handle them right in the shop? And, incidentally, are we charging up to meter leaks a lot of things that should not be so charged? Are we calling something meter leaks that should not be called meter leaks? Now, start at the bench and follow a meter from the bench to the prover. Are these meters handled right on the floor? Does somebody on the floor bang them about? Are they banged about by somebody who piles them up? Are they badly handled while being painted? Follow them to the elevator and see what treatment they get on the elevator, then go to the wagons and see how they are handled there. Are our meter racks properly constructed? Are our methods of carrying these meters to the place they are to be set the best obtainable? What sort of racks have you got?" I knew what kind of racks they were using, but I wanted to find out if they were the best. Then I said: "Go out on the wagons with these meters and see if they get jarred. If so, we will try to get a wagon that won't jar them. When you get to the place of installation, see how the fitter handles the meter. See if the fitter slams it down, and if he does we will see that these conditions are changed." I instructed the man to see if the meters were handled like gold watches. That is the treatment supposed to be given in the shop. I also instructed him to see if anything was done that should not be done, and when he got through to tell me in order that I could deal with the repairer or the handler or the fitter, and fix the responsibility. We have a great many complaints evidently caused by poor handling. We are always experimenting with meter racks. We have recently gone into the carpet bag business, and I think it is helping us. We use a rack which is set flat along the sideboard of the meter wagon, with a wide canvas strap to hold the meters in place. We put carpet bags around meters, using the same racks and straps on wagons, and find that, after carrying meters around for two weeks on wagons, they prove correct and have not a scratch on them. When using covered meter wagons these carpet meter bags can be suspended from the roof of the wagon inside, I think, with success. We do not perpetuate the numbers of our meters. We use the maker's number only; and when a meter is destroyed that number is dead. We do not test meters coming in with gas. I had a report from New York that they were testing meters with gas, but it was not recommended to me as a real necessity, as it was thought the difference in test would be so slight that it was not worth while. As to the discussion of the removal of meters, after they have been in service a certain length of time, I think this a matter outside of shop practice. I thank you.

On motion of Mr. Howard a vote of thanks was extended to Mr. Day for his very valuable information.

The President—I will ask the Secretary to read the

REPORT OF THE COMMITTEE ON PRESIDENT'S ADDRESS,

which was as follows:

We believe our President has so clearly expressed the sentiment of the members of this Assosiation, concerning the policy that should, and does in most cases, actuate the efforts of our companies, that there is little left for you to do but to indorse the ideas expressed by him.

We believe he is quite right regarding the need of low candle power, high efficiency mantle burners and improved gas engines, to which he refers.

We particularly call attention to the necessity of patient and intelligent dealings with the public, and the suggestion of our President that this policy, with sufficient publicity, will do much to ward off any demand for legislative or municipal control.

We believe gas companies should have sufficient incentive to encourage them to develop their properties to the greatest extent possible for the convenience of the public. There is a fine discrimination to be made as to what will constitute a sufficient profit to induce the investment of capital to produce these developments and the lowest price at which gas can be sold to consumers. We *do know* that, in order to be able to sell gas at the lowest price possible, the properties must be developed to the greatest extent.

Our President fully realizes these conditions, and we recommend this address receive the indorsement of this convention, and we also believe it is worthy of very careful reading and consideration by each member after returning to his home.

Respectfully submitted, E. G. COWDERY, J. E. WRIGHT, HENRY S. WHIPPLE, } Committee.

On motion of Mr. Rew, seconded by Mr. Persons, the report was adopted, that the indorsement of the President's Address be included in the report of the proceedings and that the President's Address be spread upon the minutes.

The President introduced W. J. Achelpohl, of Galesburg, Ills., who read the following paper on

OFFICE METHODS.

A great deal has been said about this subject, so that I will not be able to impart anything new. In a plant which has an installation of from 1,000 to 2,000 meters, the clerical force is usually small, so that the receiving of an application for a meter, or service, does not fall to any particular person, but is taken by anyone who happens to be at the window. Consequently the application is accepted without any consideration and the result is the beginning of a bad account. This we must all admit is not a very good method of doing business, as everybody's business is usually nobody's business.

Another point now enters and that is prompt installation of the service, as unnecessary delay often causes the new customer to become dissatisfied immediately, which feeling is very hard to overcome. This has a tendency, though, in our desire to get new business, of neglecting our old customers failing to give proper attention and trying to correct complaints such as adjusting burners, leaks, errors in reading meters and changing and testing faulty meters, which go a long way in keeping the goodwill of your customers.

Meters should be read at regular intervals, so as not to have any variation in the bills other than the length of the days. The meter readers should be instructed as to the importance of reading meters correctly and regularly, and make every effort to get the reading, but not to attempt to figure out the amount of the bill, as this often causes a dispute with reference to the size of the bill, which is very hard to explain in the office.

A number of companies have adopted the system of mailing postal cards to parties who were not at home when the meter reader called, asking them to read their meters and return the card with the reading to the office. This, while it saves some labor, also gets the consumer into the habit of checking the bills with the meter.

Upon the receipt of an application for a service the party's rating should be looked up, if possible, before issuing a work order for installing the service, as a little precaution at the start, and secure either a meter deposit or some form of security for the prompt payment of the account. Or it might be well to suggest the prepayment meters, as this style of meter is now becoming very popular both as to securing pay for your commodity and also as an accommodation

to your customers who desire the plan of paying for things as they use them.

In our plant at Galesburg, where we supply a great many railroad employees with gas, there are now 537 prepayment meters in use, which is 17 per cent. of the total installation, and the demand for them is increasing. During the month of December, 1907, $820 was collected from the prepayment meters, which was 10 per cent. of the total sales for that month. And I also find upon inquiry that the demand for this style of meter is also increasing in other cities.

After the application has been accepted, the meter should be installed promptly, so as to have as little delay as possible, giving the new customer a chance to use the service quickly and at the same time increase your earnings.

Statements should be rendered regularly and promptly, the first of each month, so as to give the customers ample time to check up the meter readings and verify the bill, as it is a good policy to encourage your customers to get into the habit of reading their meters and comparing their reading with the one rendered on the monthly bill. After the last discount day, the delinquent accounts should be gone over immediately, separating the doubtful bills from the slow, and given to your collector.

What method to pursue after your collector fails is the question which bothers all of us. The account in a good many instances is so small that by the time you pay an attorney a commission there is very little left. We have just recently joined the "Association of Bonded Attorneys," of Milwaukee, Wis., and have succeeded in collecting quite a number of doubtful accounts through the form of notices issued by them. I will not attempt to make a set of rules to govern the handling of an application, as often local conditions have a great deal to do with the methods of a public service corporation which would work satisfactorily in one city but not in another. In my judgment if the points mentioned were used as a key it should keep down the bad accounts to a minimum.

Discussion.

The President—I will ask Mr. McPhail to start the discussion on Mr. Achelpohl's paper.

Mr. McPhail—Office methods have changed rapidly during the past decade. At that time the number of consumers served by most gas companies was very small. Since then, on account of aggressive commercial methods, the number of consumers has increased very rapidly, and in order to facilitate the handling of this increased business office methods have changed from a slow, methodical style to very rapid, business-like methods. In handling this subject I think it would be best to divide it into three heads: Applications and order, books used; reading meters; billing and collecting. A party wishing to become a consumer is asked to sign an application for our service. If the service pipe is not already in his house he is asked to sign a service application. If he buys a stove or orders piping done, he signs a lease for the stove, piping or miscellaneous work. Every order given the Company by the consumer must be attested to by the consumer's signature. In case of a dispute you always have the application to refer to. His application for gas should be made out on a standard size cardboard card, 3 inches by 6 inches. On the front of the contract would be a space for the date, address, style of service to be furnished, space for signature, and also space for guarantor's signature, the clerk who takes the application being very careful to have these filled out properly. We might also note whether the man had ever used our service before, and at what address. In this case we could look up his previous record. If he never used gas we request him to give us a deposit equal to 2 months' estimated gas bill, or procure a property owner to guarantee his account. This, of course, would not apply to parties who were property owners. In case he refuses to give us either, he has the alternative of taking a prepayment meter, although it would be better to take some risk on a consumer than to insist on his taking a prepayment meter. These meters are largely known as instruments used to collect bad bills, or to supply gas to consumers who are poor pay, and honest men are likely to resent any insinuation of that kind. Then, again, I do not consider it good practice for a gas company to install any more prepayment meters than is absolutely necessary. The paper which we are discussing has a very strong argument against prepayment meters. For example, in Galesburg they have 537 prepayment meters in use, which is 17 per cent. of the total number. Out of this, during December, 1907, they secured $820, which was 10 per cent. of their total revenue, or 17 per cent. of their meters produced 10 per cent. of the revenue. We would not consider this very good practice, for by the complete installation of prepayment meters they would cut their revenue from 100 to 58 per cent. Our Company has installed a number of prepayment meters. The consumption on these prepayment meters was 1,470 feet per meter in July, 1907, and 1,200 feet per meter in February, 1908. The consumption on our regular meters was 2,190 feet in July, 1907, and 2,450 feet in February, 1908, or in the same ratio as the sales through the different meters in Galesburg. Regular meters are a little more trouble, and require more work in billing and collecting; but on account of increased sales they are preferable and we should make an effort to keep them in use. One Company with which I was connected would not set a meter without an absolute guarantee, either a deposit of $10 or a guarantor. This was required from consumers who were not property owners. The result was that they did not lose any consumers. After having taken the application and secured sufficient information from the consumer, the clerk proceeds to look up the consumer's rating. If he is a new man in town, of course that is not necessary, as his account is thoroughly guaranteed; but if he is a consumer who has resided in the town and has used gas before, simply moving from one address to another, we must look over his account, and if he has been poor pay we can ask him for a deposit. If he proves good, however, the clerk issues an order to set the meter and it is sent to the shop. At the same time he issues the meter order he issues a service order to the street department, and on the meter order makes notation to hold for service, the street department notifying the shop when the service has been installed so that they may proceed to set the meter, connect up the stove, or do whatever work is necessary. The service with meter application is then filed; the meter application filed alphabetically and the service order according to street number. The gas application can be handled so that in a short time the Company will not be obliged to depend on a rating book, but will have a complete rating of the credit of every man to whom they supply their commodity. The service order should be signed by the property owner. Where the Company make a charge for service work, the owner is always called upon to make payment, but where the service work is free we ask the owner to sign and guarantee a consumption of gas during the first year equal to the cost of the service. In getting up the first it is well to adopt a uniform style. You might use a blue order for stove work, a red one for service work, and a white one for meter setting. On the front of these orders we could place instructions for our fitters; on the back we could have a ruling in which we could insert the cost of all work. By following this carefully we can check a man's daily time card with the work turned in by him on orders. The above work is executed and the orders returned from the shop and street department to our office ready to be entered in our journals and ledgers. The stove order is entered in the merchandise journal, and the meter set is used to open up an account in the gas ledger. The information contained on the service order is entered in the service and main journal. The merchandise journal contains the rate, address, nature of order, price, cost of fittings, cost of pipe, cost of material and labor. Every merchandise order executed during the month is entered in this journal, and at the end of the month our totals are drawn off and we readily see the gains or losses made in that month. In computing these costs it is necessary that we should have a price book containing the prices of all material used in the work that has been done. This can be obtained very easily by entering the price of all goods received from the invoices. The service work can be entered in exactly the same manner, with the exception that we give the exact location of the service, so we may be able to find it at any time it is necessary. The meter order is taken from the shop and entered in our meter journal, a complete record being kept of all meters taken out and all meters installed during the year. From there they go to the gas ledger keeper who opens up a new account, stamps the order entered and puts the folio or district number of his ledger on the meter order card, then it is returned to the meter clerk, who enters the movement of this meter on a meter card, one card serving as long as the meter is in use by the Company. In the meter journal we have a history of each day's movement of meters. In the meter card cabinet we have a history of the meter from the time it was put into service. On the ledger we have a record of the gas consumed during its installation at any one point. In this way we guarantee ourselves against the loss of any meters. These orders are all made out in duplicate, and the duplicate checked against the originals. In case an order is lost we are very soon made aware of the fact, as we have been unable to file our duplicate order and we call on the shop or street department to supply the missing number. If they cannot furnish it we make out a duplicate and have them go to the residence and get the

information required. From the merchandise journal our clerk enters all charges in the merchandise ledger. On these accounts we use a loose-leaf system, a single acount to the page. If necessary, we can divide the page up and keep our stoves, house piping, lamps and fixtures and the coke account separate. Many companies run all these different accounts under one head, not caring to make the sub-division. The accuracy of the entries from the journal to the ledger is checked up every month on our balancing, there being no chance of the clerk making an error by omitting some charges if he balances his books correctly. This we ascertain by an occasional audit of his ledgers. There are at the present time two distinct ledgers in use. One is a continuous ledger, the other a loose-leaf ledger, of 4 or 6 years' duration. The continuous ledger is the best, when looked at from a standpoint of economy, as it is more easily balanced and can be kept with cheaper help. It is, however, more difficult to explain to a consumer who has to be shown the ledger in order to convince him that his bill is correct. In this case, however, the bookkeeping is not more important than the meter work. You must have a man on these ledgers who understands thoroughly how to keep an absolute record of his meters. We should require him once a month to count his meters and turn in a balance on them at the same time he balances his sales and receipts. The meter reading, billing and collecting are the next matters of importance. Meters should be read as near the same day of each month as possible. Our meter books should contain a slip for each meter, these slips divided so as to last an entire year. We should be able to detach the previous month's reading before allowing our books to go out to the meter readers. In this way we prevent any chance of an estimated reading being turned in. It is especially so where meters are read at so much each. The meter readers turn the meter books into the office and the bookkeeper and a helper make out the bills, the bookkeeper handling the ledger and the helper calling the reading and making out the bill, entering the reading, consumption and amount on the body of the bill and the amount on the stub. These bills should be gone over beforehand and skeletonized and the date of the reading of the previous month should be inserted. As soon as the entry from this reading has been completed the bill is made out to be turned over to the keeper of the merchandise ledgers. He enters his merchandise charges on the gas bills, makes a total and the bills are delivered to the consumers, who call at the office before the discount period to make payment, the cashier cutting off the stub and giving the consumer the receipted body of the bill. These stubs are added and used to balance cash, then turned over to the bookkeeper for final entry in the ledger, then filed away for reference, if it is ever necessary to use them. All the cash received is entered the day following discount day and the ledger keeper then goes over his ledger and takes off a list of all unpaid gas. This list is turned over to the chief clerk or manager, who checks the bad accounts and notices are sent to every consumer, those whose accounts are bad receiving a shut-off notice, the other simply a notice that the bill is unpaid and asking them to call and settle. If at the end of a certain time those who are notified that they would be shut-off do not call, our meter readers or our shop men are sent out to shut-off their meters. We have found it a very effective method in collecting accounts of long standing. These consumers usually pay rather than be deprived of the commodity. This practically covers the actual record keeping of a gas office. Of course we have the general bookkeeping. That we will not discuss, but outside of this it is necessary that we should have our office well-equipped and sufficient help of the right kind to wait upon every consumer. We must insist that our clerks treat the public with all courtesy, always ready to give information of the right kind, and insist on satisfying consumers that the gas company is doing a legitimate business, selling a product for what it is worth, allowing only a fair profit, and not charging such exorbitant prices as some self-styled reformers would have them believe. The success of the company depends largely on the attention given the individual consumer in the office. Office help, by right treatment of the public, can easily make the gas company the one corporation in any city that is well thought of by the public. Prompt attention in the office, good service at all times, and courtesy to our patrons, will insure our success.

The President—I will ask Mr. Negley to take part in the discussion.

Mr. Negley—I have not a great deal to say in connection with the two excellent papers that have been read, but I might add a few remarks upon the way we handle our business in a small office. Our city has only about 8,000 people, and we have only some 1,400 gas meters, although we have electricity in connection. That makes the number of meters about 2,000. The chief aim in any office should be to have the most efficient methods with the smallest possible clerical force, and in our office there is only one assistant and myself. I think we have the force down about as small as it could possibly be; but in a great many offices I think the so-called "red tape" is carried to such an extent that the smallness of the clerical force is almost lost sight of. We must all admit, however, the fewer times an item is transferred the less chance there is for errors. Our office force represents our company to the people, and if we wish to be well represented our employees should be so instructed. The old maxim "A soft answer turneth away wrath" is certainly applicable in the gas office, and if our clerks have patience in handling complaints that come in, it will go a long way toward holding the goodwill of the people. As has been said, most anyone can get a customer to take out a service, but to satisfy a claim, collect a bill, and still retain a satisfied customer are what we want. We are very strict with our delinquents. All accounts not paid by the 10th are notified that same is past due, and to please call and settle. If a reasonable excuse is offered the time is extended, but if we do not hear from the party in a week, another notice is sent, giving a certain date upon which to pay, or to have the service discontinued. We watch this date very closely, and accounts that are not paid by that time are discontinued, and in this way we keep our delinquents and our uncollected bills down to a minimum. We also have a very large discount, it being 25 per cent. on light bills, and 33⅓ per cent. on fuel, so it may be readily seen what a saving is effected by paying before the 10th, and there are not many customers who let their bills go by if they really intend paying them. We read all of our meters along about the same time in the month, say 4 days before the last of the month, and our bills are all delivered by carriers. We use an outlook envelope to put our bills in, thereby saving an extra address, and the chances of getting a bill in a wrong envelope are materially lessened. The boys who deliver notices are instructed to use the same care a mail man would use, and not to rush this part of the work. We use the meter ticket that one gentleman spoke of, and they cover a period of 2 years, but we do not detach any slips. Our readings are carried along from one month to the next. While I will admit that is a poor policy in one way, it gives the meter reader a chance to look back and figure the party's bill for him; but oftentimes we have noticed that the boys compute the bills as they go along, and they very often catch any errors in meters not registering, or are able frequently to detect an error that they might have made in reading the meter. If they find a bill is unusually large or small, they will go back and reread the meter, whereas if they had no conception of the size of the bill they would pass it along, and we would have to catch it in the office. We find that a very good plan, and then we do not have to copy the readings every time, and it saves us work in the office. We also use the loose-leaf system in our office, and the card system. Our bills, notices, meter readings, slips and ledger leaves are all numbered in the same rotation as the accounts run, from house-to-house, and street-to-street, so that when we start copying everything runs along in the same rotation and it can be easily followed. We are very particular when a person applies for gas, to ascertain whether he owes any old bills or not, and such are not connected up until the old bills are paid. Oftentimes in that way we have succeeded in collecting old bills that we could not collect otherwise. A short time ago a lady came to our town who had been there as a transient, you might say, before. She moved in on us when we did not know that she was going to moved in and used gas and then left town, also her gas bill. When she came back about 2 years afterwards she was rather surprised to find that we knew that she had used the gas before, but we held her strictly to account and she paid the bill before we would connect the gas. She paid all right, but she was a little slow in doing it. We keep a duplicate of all of our bills in the office. That is a little extra work, I will admit; but in our town a great many of the men work in the shops and they stop and get their checks cashed and pay their bills, and if we required them to bring the bills along it would be a great inconvenience to them, and we find that by using rubber stamps it does not take much more time to make out a duplicate in the office. If they do not bring their bills, we then have a duplicate in the office and can simply stamp them paid. In that way we save some help at the latter part of the month and it does not cost us much more.

The President—As the hour is getting late, I will ask Mr. Achelpohl to finish the discussion.

Mr. Achelpohl—As to the consumers moving out before the boy got around to read the meter, I will say that the prepay meter took care of that, and the funds were in there. If the next party that moved

into the house would not give us a memorandum of the change, we got that information the next time the boys called, and we got our money. We have some, quite a number, that use just as much gas with the prepay meters, oftentimes some of them use more. Some of our customers used $10 to $12 worth of gas in private residences, some of them $5 and $6 worth. This does not apply alone to railroad people. We find a number of residents have gotten into the habit of using the prepay meter and whenever they need the gas they go down and put in the money and that is the end of it. There are no bills to take care of. My paper is gotten up to apply to a plant that has about 2,000 meters, and our force would not have time to go into the detail record that the gentleman speaks of, but the way we handle it enables us to get the information wanted very readily. With regard to duplicate bills, we send out an original bill and keep a stub. Anyone that comes in without a bill just gives a memorandum of the amount of the bill and we give him a receipt for it in the shape of a coupon.

The President—Gentlemen, that closes the programme so far as the Association work is concerned. If there is no other business before the Association it is in order to adjourn. [So ordered.]

An Often Neglected Asset: The Old Consumer.

[Prepared for the JOURNAL, by MR. H. H. MCPHERSON, Denver, Col.]

The steam engine of to-day is in principle, and as to its main working parts, the same as it was 100 years ago; and yet no one would think of saying that this means any lack of progressiveness. It is simply because this original principle has not been improved upon.

All of this is equally true of the modern gas meter. For over 60 years it has stood the test of public criticism and has always come safely through because it was so reliable a measuring instrument that it could not be improved upon. And this is the same meter which the consumer proves wrong after one look at his gas bill, by remembering every foot of gas used during each of the last 40 days.

It is absurd to believe that any thinking person could be honest in such an opinion, and, therefore, the only way in which this general attitude of the public toward meters can be explained is by recognizing a more or less general state of ignorance of the facts, coupled with that peculiar phase of human thought which makes a man, otherwise fair, blind himself to reason. This is proven by the fact that 9 out of 10 persons who complain about high bills say, "I absolutely know that I haven't used it. There must be something wrong with my meter." Investigation may show that the real cause is some small error, or that the bill covers more days than the previous one. The point is that the damage has already been done, and, while the consumer may feel satisfied at the time, he has acquired a suspicion that his meter is in some indefinable way to blame.

This state of mind is produced by a series of perfectly definite impressions made upon the consumer directly by company errors and some few fast meters, but mostly by slow ones, and indirectly by his innate suspicion of a public service corporation, bolstered up and finally turned to a certainty by direct impressions. The perfectly obvious remedy is to make these impressions so definite and the real truth so transparent that he cannot help seeing it.

Errors will creep into the best of organizations and perfectly accurate meters for every consumer are an impossibility. Therefore, when a satisfactory minimum in this direction has been reached, after years of effort and dollars of good money have been expended, there will still be a large and very expensive complaint list; but if the consumer can be educated to believe in his meter, then this same consumer will read his own meter and thus prove to himself that he is getting a square deal.

Mistakes, such as overreading, which would cause the consumer to pay for gas in advance, or underreading, which, while it makes him feel good by giving him a small bill this month, more than offsets this good feeling by the inevitable manner in which it corrects itself next month, would be expected and perfectly understood if he read his meter, instead of appearing like highway robbery.

The same man who makes his wife check every grocery bill never stops to compare the meter statement with the consumption called for on the bills, or to see how many days' consumption they cover. He knows the price to be paid per 1,000 cubic feet and is, therefore, in a position to check the accuracy of everything involved in the bill except the meter. Then the only other factor that can possibly trouble him is his own family; but that will never occur to him until he is brought to believe in his meter. The most important consideration in teaching a consumer to believe in his meter is to show him in every possible way that the meter is actually the last thing to be considered as the cause of a high bill. Probably the best medium through which to carry on this campaign of education is the bill itself.

Begin by setting aside a space on the left end of the bill for talks to consumers. The first talks should explain the object of the campaign and take up in detail the various items on the bill, showing how clearly they set out the facts used in determining the amount of the bill.

Following these should come a discussion of how a meter is read and the bill figured out, accompanied with some examples showing how important this is to the consumer. After making sure that they are well enough educated to understand, explain the effect on the amount of the bill of overreads, underreads, and the number of days' consumption shown by the bill. By this time the consumer should understand enough to enable him to see that the majority of high bills are due to some cause outside of the registration of his meter.

But in order to assure him of this the talks should take up the construction and operation of the meter, tell about it in a simple, straightforward manner, show figures of average tests of all meters for several months previous, and explain the methods used to keep them in good condition. Follow this by a description of the company's attitude on the question of meters, showing a willingness to test any consumer's meter in his presence, and also accompanied by records showing how most of these tests show "O. K.," or slow.

It must be remembered that any quoted company records are looked upon with suspicion. Therefore, remove every possibility of error in them and give the month's list complete, or not at all. Selected or biased figures do positive harm. The better these records are the more good the figures will do, and hence a very large part of the success of this plan depends upon the co-operation of other departments in cutting the number of errors and incorrect meters to a minimum.

At every step in handling meters it must be remembered that if the company is not perfectly frank with the consumer it will defeat the very object in view, namely, to clear away his suspicions and make him see the real truth. This paper would fail in this object if it did not show the way *not* to apply the principles which it explains.

Any change in the attitude of the company or in its methods vitally affects the consumer. It can eliminate overreads and underreads or make all bills for 30-day periods only, without explanation to him. But in eliminating as nearly as possible all slow and fast meters wherever found everything depends upon how it is done.

If the bookkeepers are instructed to report all suspiciously low consumptions and to investigate each case in order to determine whether the consumption really is low or the meter slow, and hold the bill while doing so, the consumer will certainly resent this apparently unwarranted intrusion into what he regards as the affairs of an honest man and a well behaved meter. If the meter is found to be slow and it is removed and replaced with a correct one, up go the bills to where the company knows they should be; but the consumer does not know this. He believes that the company has deliberately replaced a correct meter with a fast one.

The average consumer simply wants to know what he is paying for and to feel that he is being treated fairly. Such methods antagonize him needlessly, while if he had understood why his meter was changed he would have been perfectly satisfied.

Once the meters are put into good condition they should be changed at least every 2 years. In addition every case of low consumption should be investigated and a particularly close watch kept on meters located near furnaces or heaters. Only in this way can the public be satisfied and such troubles as franchise fights and municipal ownership agitations prevented.

In conclusion, it might be said that this plan on paper is simply an application of the methods used in the most successful complaint departments in the gas and electric business. The difference lies in that this plan forestalls complaints by presenting these facts to the consumer instead of allowing him to get into an unreasonable state of mind and then trying to reason him out of it.

Lighting Fixtures from a Manufacturer's Point of View.[1]

By MR. F. C. DICKEY.

Attention has been directed to a recent criticism to the effect that the lighting fixture manufacturers and dealers generally are lacking in progressiveness, and are from 10 to 15 years behind the times, possibly a few words from a manufacturer's standpoint may not be wholly without interest.

It is to be admitted that the primary idea of establishing a manufacturing plant is to obtain a profit on the capital invested. In order to accomplish this result not only must skill, care and economy be exercised in the conduct of the business, but equally important must

1. Phila. Section, Illum. Eng. Society; reprinted from the Society's "Transactions," March 20, 1908.

it be that the manufacturer produce fixtures which will be quickly purchased by the users, so the business will be continued and become permanent.

The manufacture of lighting fixtures is a complicated process and one not at all as easy as it looks. There are many elements to be considered and employed before a satisfactory article is produced, and the industry is essentially one which combines the artistic and mechanical in a high degree. The designer, who is also an artist, embodies his thoughts and ideas in a sketch which the artisan reproduces in a tangible and practical manner, out of such refractory materials as brass, iron, glass and combinations of them, so that gas or electricity can be conveyed to the several distributing points of the fixture, and thus be made to serve its purpose of being a source of illumination as well as a pleasant object to the eye.

If the lighting fixture manufacturer is successful he must be progressive, for the law of trade knows no favors, and lack of progressiveness and individuality would soon eliminate such a producer from the field. Hence it follows that if the stock of a manufacturer or dealer contains any fixtures which are of a style which was in vogue years ago, the thought naturally suggests itself that he has not fully realized or appreciated his position. If he did, it should quickly have become apparent to him that the proper course to adopt would have been for him to lessen the price on the slow moving articles, so that he could readily dispose of them and thus make room for more modern and quickly moving pieces, and accordingly more profitable ones. This, no doubt, is often done, as the veriest tyro in business matters soon recognizes the fact that the slowest moving stock is the most expensive and the least profitable, by reason of its requiring so much dead capital, which becomes more costly and burdensome every year, due to the accumulation of interest necessary to carry it, and from which no return can be expected.

I do not think, however, that there are many such stocks of fixtures at the present time, and am confident that if access could be had to the records of the manufacturer or dealer it would be found that the majority of the so-called "old styles" are goods which have been only lately manufactured or received from the factory, and are of a staple or standard character, and are being constantly reproduced as a result of the demands of his trade and successive re-orders, and which are so complete or general in character and so fully answer the essentials that, from a trade standpoint, he would be committing a blunder in discontinuing their manufacture.

The manufacturer and dealer are entirely dependent upon their trade for their existence, and if either of them fails to appreciate or grasp the requirements of his trade, he will soon be lost sight of, and while they may be regarded to some extent as the teachers of their clients, and do endeavor to instill more aesthetic ideas in their tastes, none is so situated financially as to be able to take a rocklike stand and offer himself as a willing sacrifice for the sake of the ideal, which, in the majority of cases, would be brushed aside for a more tawdry or showy object anyhow. No manufacturer is in a position, at the present time, to confine himself entirely to purely ideal fixtures and produce enough of them to return a satisfactory profit; whether willing or not, he is compelled to turn out the more showy, even if less artistic, pieces, which please the eye of the greater number. Still the present prominence of the fixture industry is undoubtedly due to the foresight and progressiveness of the manufacturers, stimulated by the demands of the trade and by competition, and is destined to become even more prominent as the value of fixtures in the decorative art becomes more fully recognized.

Criticism of the manufacturer, for lacking in originality and failing to produce something entirely new and different from anything extant, is a sweeping one, not altogether warranted by the facts. It must be borne in mind that he is handicapped by the same limitations which prevail in architecture and decoration in general; that is, that our forbears' conception of the artistic and utilitarian were so comprehensive and well adapted for the purpose that we of this date have not been able to devise any new radical types without, of necessity, absorbing some of the older ideas and changing them to suit modern conditions. However, the lighting fixtures of to-day, both gas and electric, are artistic and individual in a marked degree, and are not mere copies or reproductions.

It has been said by a writer that "Originality in art, as in everything else, is an affair both of individual endowment and thought, and of social recognition and confirmation." An affirmation of this sentiment, from the point of view of the manufacturer, is found in the numerous notable installations which abound in all sections of our country, and which surely refute the statement that he is so far in the rear. These notable examples could be reproduced in an almost endless manner by sundry changes in detail and treatment, and to the satisfaction of the producer, architect, engineer, and decorator as well as of the user. All can enjoy the delight of having specially designed fixtures, which display originality in conception and execution, provided a sufficient sum of money is allotted to produce the desired result.

Until within a comparatively recent period the question of the lighting fixtures was almost invariably pushed aside until the building was nearly completed or ready for occupancy; then it was often found that the estimated cost of the building had already been exceeded, on account of various changes being made as the work progressed, and then the dictum given to the fixture man was that economy had to be exercised.

This statement may seem to be a liberal one, but reflection will enable one to discern that herein is the probable reason for a large number of the incongruous installations we see. In many instances there have been sums of money spent for fine decorations, often running into hundreds of dollars for a room, and more often than not the entire artistic effect is at least marred, if not spoiled, by the use of improper fixtures. The lamps will provide sufficient light, it is true, but the fixtures do not carry out the harmony, and a discord, so-to-say, is produced, caused by an outlay for the lighting fixtures of from one-fiftieth to perhaps one-twentieth of the cost of the decorating.

All fixtures should be in harmony with their surroundings, whether in the home or public places, and failure to observe this requirement is a fruitful source of disappointment. They should be given the same consideration and thought as any other detail of the general plan, and the more this fact is emphasized and practiced the sooner the desire of the expert for greater improvement will be realized. If we are dissatisfied with the papering or decorating of a room as soon as practicable we have it changed, but in innumerable instances the old fixtures are permitted to remain without even being refinished.

The selection of the means of producing light depends upon local conditions and individual taste, and must, therefore, be left to the user. Whatever the means may be, we think the best results of illumination are to be attained by the use of a fixture or chandelier supplemented by the side brackets in some of the more important locations; in small and unimportant rooms the simple side bracket alone is usually sufficient. Aside from trade reasons, the use of the central fixture or chandelier seems the most logical one, as by no other means can the average room be more evenly illuminated. If side brackets alone are employed, then the immediate vicinity of the lighted bracket is practically the only space favored, unless each wall is equipped with a sufficient number of brackets, the effect being surely one of lights and shadows.

The best manner of lighting a church or a hall, rectangular or square in shape, and not broken by a balcony or gallery on the sides, is by the use of fixtures on both sides of a central line, so hung that each one becomes a center of light distribution. If the church should contain a balcony, then it would probably be expedient to have a large central fixture and side brackets on the face of the balcony and on the walls beneath it.

For rooms with low and panelled ceilings, where electricity can be obtained, the use of fixtures which can be placed close to the ceiling is to be recommended. If gas alone is the medium of light, the fixture necessarily must have a longer central stem; the numerous styles of inverted burners, however, permit the use of types of fixtures which a few years ago were not thought of.

It is a fact that modern artificial light sources are too bright to be used uncovered. Where the light is to be used for a careful vision, such as reading or writing, the lamps should be inclosed in globes or shades, which will diffuse the light and at the same time protect the eye from the direct glare.

In the lighting of the house we cannot conceive a more generally satisfactory method than the use of a central fixture, and, in addition, side brackets if needed. In the home, where we expect comfort not elsewhere obtainable, the matter of light becomes one of convenience and concern. If the house is a suburban one it has a porch which serves one of two purposes; a sheltered entrance to the house, or an open-air sitting room. The lighting, therefore, should be designed in accordance with the purpose which the porch is to serve.

In the vestibule or entrance hall a hanging lantern or ceiling pendant, properly shaded or globed so as to give a comparatively dim light, is all that is required. In the reception hall there should be the tasteful chandelier, and if the hall be of the so-called "Dutch"

type, with its inviting fireplace, the most natural locations for the brackets are on either side of it. For the reception room a central fixture is usually sufficient. For the parlor or drawing rooms a central fixture and side brackets; if the room is sufficiently large, two fixtures can be used without detracting from the decorations, and in this manner remove any objections to the excessive number of burners or lamps at one central point which would otherwise be required to properly light it. The lighting of a parlor, or of a reception or drawing room, should be sufficiently brilliant to bring out the full effect of the furnishings of the room and the costumes of the occupants, and still be as free as possible from dazzling spots and deep shadows. In the dining room and library, more than in any other part of the home, is the value of a central fixture demonstrated. In each of these places it is essential that the table receive the major portion of the light, and yet the source of light should be hidden as much as possible; for this purpose no better type of fixture could be employed than the dome with its central lamp and additional arms on the outside, should a general light, more than would be diffused by the central dome, be required.

Art glass, in its almost infinite variety of colors, lending itself as it does to any color scheme, has lately been supplemented and to a great extent supplanted by the ground glass, with cuttings and etchings, reproductions in a modern way of shades and shields of the so-called "Colonial" period, which are particularly effective in accentuating the delicate tints of the decorations and furnishings.

In the bedrooms a general daintiness in the treatment of the fixtures should be prerequisite, and a fixture suspended from the ceiling and side brackets at a point in the room which would most naturally be selected for the location of a dressing table or bureau are the most effective means of illumination. Great care should be employed in the location of the outlets in these rooms; they should be removed to a distance far enough away from windows so that there may be no danger of a fire caused by a lace curtain being blown into an open gas flame.

For a bathroom two side brackets are the most desirable, and they will be found to be convenient adjuncts, as in the majority of bathrooms the space at hand is very limited, and a fixture suspended from the ceiling is often in the way.

The "den" or smoking room is essentially one where fancy, comfort and individuality take precedence over conventionality, and the main point to be kept in mind is to secure a soft, warm light, one which will prove its companionableness in much the same silent and sympathetic manner that a good book does.

For lighting a billiard or pool table a chandelier with the lamps in a line with the long axis of the table is the most efficient. The lamps, of course, must be so shaded as to be entirely out of the field of vision and cast no perceptible shadows on the table.

The proper lighting of a bowling alley was for a long time a nightmare to contractors, but this has now been happily overcome by the use of a sufficient number of pendant fixtures and curved reflectors or shades, which apparently have remedied the former troubles.

In conclusion, the writer begs to express the hope that these remarks from a manufacturer's point of view be not considered as arbitrary or unalterable, but only the expression of an individual opinion. As a result of the intelligent co-operation of the manufacturers with the illuminating engineer, who has already accomplished so much in the very few years he has been engaged as a specialist, we should look forward to the time in the very near future when many of the faults and evils heretofore existing, and for which the fixture man was held accountable, will have disappeared.

The Glover-West Device for Coaling Vertical Retorts.

British Letters Patent were issued last week to Messrs. Samuel Glover and John West (respectively of St. Helens and Manchester, England), for apparatus for charging vertical retorts. The patentees specify:

The invention has reference to and comprises apparatus for feeding coal to vertical retorts used in the process of destructive distillation, and has for its object "To feed the material into the retorts in a regular and constant manner, and to facilitate the withdrawal of the gaseous products through any desired depth of the material which is being fed into the retorts - such depth being constant notwithstanding variations in the amount of coal in the hopper."

In order to accomplish these objects, a rectangular or square chamber is constructed and connected to the under side of an overhead bunker or hopper by means of one or more gas-tight valves. This chamber is constructed of two parts—the lower part taking the form of conical outlets (one for each retort), while the top may have a rigid attachment to the lower part, or be made to telescope into the lower part. To each conical outlet is attached a tapered tubular shoot, which leads direct into the retort, and the space in the retort above the level of the charge may be varied as required by raising or lowering the bottom section of the chamber when it is adjustable. The telescopic connection between the two parts would allow this to be done more readily, or the tapered tubular shoot may be connected to the retort, in which latter case the retort will be completely filled with coal.

The tubular shoots are connected to the conical outlets from the chamber in a manner which permits sufficient space being left for the gaseous products to pass through, and thence into the material in the chamber above.

A number of vertically adjustable pipes are suspended within the chamber; and, under normal working conditions, these pipes have the lower part of their lengths immersed in the material contained in the chamber. The gaseous products pass first through the material, then through the pipes, and so into the space in the upper part of the chamber. The object of using these pipes is "to facilitate the maintenance of a constant and even pressure within the retort." The pipes may either be perforated or plain, or partly perforated and partly plain.

At stated times, the chamber is charged with material from the overhead bunker, and as the residual products are discharged from the lower ends of the retorts, the charge contained in the chamber flows into the retort at the same rate as the discharge takes place, and so maintains a constant level of material in the retorts.

Fig. 1 is a sectional elevation through the charging apparatus, and shows the chamber constructed in two parts—one part telescoping into the other—and with tapered tubular shoots which project into the retorts. Fig. 2 shows the chamber constructed without the telescopic contrivance, and is an alternative arrangement in which the tapered shoots do not project into the retorts, but are connected up to them.

A, are the vertical retorts; *B*, the upper part of the chamber; and *B*^{1}, the lower part which is made to telescope into *B*. When arranged as in Fig. 1, the tapered tubular shoots *C* are fixed to the lower ends or outlets of *B;* and slots *D* are formed at the lower ends of *B*^{1}, "so as to present a large surface of coal to the gaseous products of distillation."

In the arrangement shown in Fig. 1, the distance to which the shoots are in the retorts is adjusted by raising or lowering the telescopic part of the chamber *B*^{1} by means of the rods *E*, which pass through the gas-tight stuffing boxes *F*.

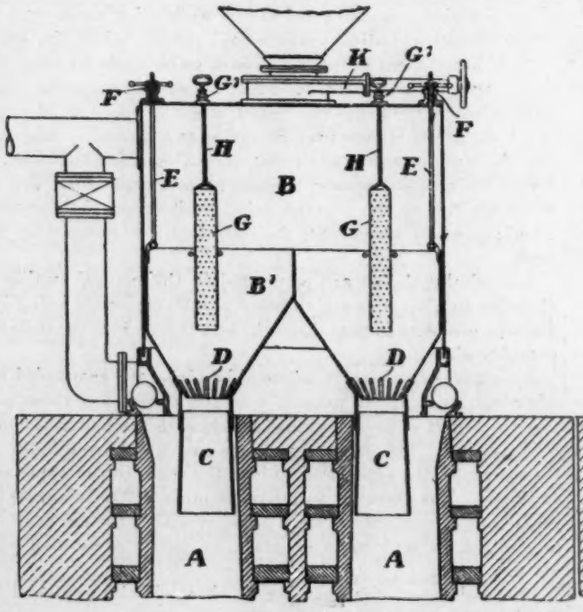
The pipes *G* are for conveying the gas from the body of the coal contained in the chamber *B*^{1} to the free space in the upper part of the chamber *B*—the object being "to insure the gases passing through a constant depth or body of coal, and to this extent facilitate the maintenance of an even pressure within the retorts, the depth depending to some extent on the nature of the coal itself."

The pipes *G* may be of any desired number; and the depth to which they enter the coal may be varied by means of the rods *H*, which pass through the stuffing boxes *G*^{1}.

At stated intervals, the coal is fed through the gas-tight valves *K* into the chamber *B*. It then passes into the retorts through the shoots *C;* the rate of feeding being dependent upon the rate of discharge at the lower ends of the retorts. The gaseous products of distillation pass through the slots *D* into the coal; thence through the pipes *G* into the space above the coal; and thence to the condensing plant.

In Fig. 2, the two parts of the chamber B and *B*^{1} have a rigid attachment, and the tapered tubular shoots *C* do not enter the retort. This arrangement enables the retorts to be comp'etely filled. The gaseous products of distillation pass through the lower portion of the coal, and through the pipes *G* into the space above—as in Fig. 1.

The claims are: (1) In a retort the means for maintaining constant the depth of material through which the gaseous products of distillation pass, consisting of the charging hopper having a tubular shoot that enters more or less into the retort, gaseous inlets from the retort into the hopper, and an open-topped pipe descending into the material in the hopper. (2) The application of a plain or perforated open-topped tube or tubes with vertical adjustment for decreasing or increasing the depth of the coal through which the gaseous products of distillation pass. (3) The provision of a tapered tubular shoot, which has a vertical adjustment and enters the retort for the purpose of regulating the depth of coal in the retort. (4) In apparatus as claimed



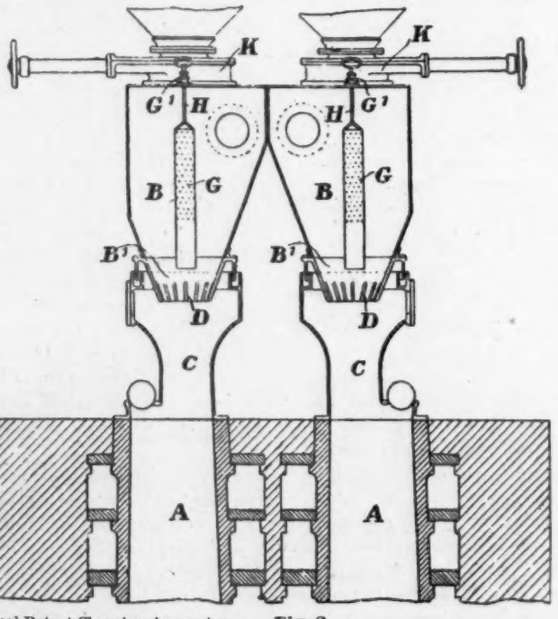


Fig. 1.——Glover and West's Vertical Typical Retort Charging Apparatus.——Fig. 2.

in Claim 2 for charging vertical retorts, in which the depth of coal through which the gaseous products of distillation pass is kept constant, the provision of a fixed tapered tubular shoot of supplying the coal from the feeding chamber to the retort when it is desired to completely fill the retort. (5) The retort for distillation of coal provided with means for maintaining a constant depth of fuel through which the gaseous products of distillation pass.

New Municipal Plant at Winnipeg.[1]

The largest producer gas plant yet placed in Canada is at present being installed at Winnipeg, at the municipal pumping plant for fire service.

The gas plant equipment consists of a pressure type producer gas plant of several units, totaling 4,500-horse power capacity, designed to operate on bituminous coal, lignite or anthracite. There is also being installed a large gasholder intended to provide adequate reserve of gas for the engines. The engine equipment consists of 4 double cylinder tandem gas engines, each of 500-horse power capacity; two engines of 250-horse power each; also a couple of smaller engines for operating the air compressors for starting the large engines; in all there is a total of nearly 3,000-horse power in engines.

The gas plants and engines were built by Crossley Brothers, England.

The 6 large gas engines are geared directly to 6 power pumps.

The power plant is designed to supply water to the high pressure fire mains at a pressure of 300 pounds per square inch. One unit, consisting of producer gas plant, gas engine and pump, will always be kept at work maintaining adequate pressure in the fire mains, and in case of a serious fire all the engines and pumps are operated, taking gas from the reserve gasholder until all the producer gas plants can be started up, when each engine will then be supplied with gas by its own producer.

All the engines are single acting. The 4 large engines have double cylinders, arranged in tandem, the glands in the front cylinder being packed with metallic packing. The cylinders of these engines are 32 inches diameter and 36 inches stroke. The speed is 120 r.p.m.

The engines are governed by varying the quality of the mixture, the volume of the charge remaining constant. This varying of the mixture of air and gas is accomplished by varying the time of opening of gas valve, the gas and air valves always closing at the same time.

The engines are fitted with horizontal balanced exhaust valves, which, on account of the balancing provision, are operated very easily without excessive pressure on the side shafts. These valves are particularly handy for inspection and cleaning.

The crankshaft bearings are oiled by ring lubricators, and a system of forced lubrication distributes an ample oil supply to all working parts of the engine.

All the pistons and piston rods are water-cooled. Duplicate electric igniters are fitted to each cylinder.

One of these engines was subjected to a very exhaustive test before shipment, by Dr. J. T. Nicholson, of the Manchester University. The tests were undertaken with the object of measuring the brake horse power of the engine and of gauging the gas consumption per brake per horse power hour. The gas used, that from a producer, was also sampled, and analyses made, so that a computation of the thermal efficiency of the engine might be made. Observations were also made on the speed variation of the engine between full load and light load, so as to test the new system of governing.

Observations began after the engine had been running for nearly an hour, so as to give it time to settle down. The amount of gas used was measured by noting the rate of fall of a large gasholder, when all sources of supply were closed, and only the engine was drawing from it. After the engine supply valve had been closed at the end of the trial, the further rate of fall of the gasholder, due to leakage from the mains and connections, was noted, and the amount so determined per unit of time was deducted from the observed delivery from the holder during the trial. The temperature and pressure of the gas delivered by the holder during the trial were also observed so as to permit of the reduction of the gas used to an equivalent mass at the standard pressure of 29.92 inches of mercury, and a temperature of 32° F.

The calorific value of the gas was determined both by burning a sample of it in a Junker's calorimeter during the trial, and by a chemical analysis taken from the supply pipe during the same time. The brake horse power was obtained by means of a hand brake upon a special water-cooled pulley bolted to the flywheel. The weight of the various parts of the brake and the weights added during the trial were checked, and the distances between the center lines of action of the weights were carefully measured.

The gas used was made from bituminous slack coal in a Crossley producer plant. The analysis of the gas gave the following results:

Carbon dioxide (CO_2)	11.4	per cent.
Oxygen (O)	1.0	"
Carbon monoxide (CO)	15.1	"
Hydrogen (H)	24.3	"
Methane (CH_4)	3.5	"
Nitrogen (difference) (N)	44.7	"
	100.0	

The calorific value in accordance with this analysis worked out to 156.5 B.T.U. per cubic foot. The value obtained by the Junker's calorimeter was 149 B.T.U. per cubic foot at the temperature and pressure of the instrument.

The volume of gas used by the engine equals 29.037 cubic feet at 32° F. and 760 mm. of mercury.

1. The *Gas Engine*.

The barometer readings were 30.21 inches. The brake horse power worked out to 559. The gas used by the engine per brake horse power per hour at 22° F. and 29.92 inches of mercury was therefore; 29,037 divided by 559, or 51.94 cubic feet. Hence the heat supplied was 51.94 × 156.5, equalling 8,128 B.T.U. per brake horse power hour. The thermal efficiency was accordingly 2,546 divided by 8,128, or 31.32 per cent.

This result the report declares to be highly satisfactory.

The engine was found to vary in speed from 119.4 to 121.4 r. p. m. when the horse power was instantaneously dropped from about 600 to 50. This represents a total variation of 1¼ per cent. of the mean speed. The full load was then thrown on again as quickly as possible, the same process being repeated again and again. The speed never varied more than the percentage mentioned above.

As before stated, the engines are direct connected to double pumps. The pumps are of the triplex, double-cutting type, and they are driven by a cast steel gear, 9 feet 3 inches in diameter, meshing with the gear on the engine shaft. The pinion is driven from the engine shaft through a patent friction clutch so that the engine can be started light, and the pump thrown on after the engine is in motion. This arrangement was adopted because there was some idea of using a large gas engine to drive an electric generator during the time when they would be called upon to furnish power for the pumps. With this object in view the design included clutches between engines and both the pumps and the generator, so that either one could be connected to the engine at a moment's notice. In starting the engines it is not necessary to disconnect them from the pumps by means of the friction clutch, and indeed in the case of the smaller engines there is no friction clutch installed, the pinion being keyed directly on an extension of engine shaft. In order to relieve the load on the engine at starting each pump is provided with a by-pass controlled by an hydraulically operated valve. When started up, this valve is left open, so that there is no back pressure on the piston. As soon as the engine comes up to speed the by-pass can be gradually closed.

The two large pumps and one small pump, with their engines, are arranged on each side of the engine house, with two lines of 20-inch mains running through the center of the house, one main running right and the other left hand. There is an air vessel 30 inches by 18 feet high in the clear at the outlet end of each main, with a sluice valve beyond the air vessel. Each set of pumps is connected to both of these mains with suitable valves to allow of pumping into either end of main at will. There is, of course, in addition a small air vessel on each pump. The connecting pipes between the pumps and mains are 12-inch and 9-inch diameter for the large and small pumps respectively. Suitable valves are provided for charging the air vessels by means of the air compressors provided for the gas engines.

Bureau of Information, The American Gas Institute.

BUREAU OF INFORMATION,
THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, 716 LOCUST STREET, ST. LOUIS, MO.
W. A. BAEHR, Chairman.

The budget for the week from the Bureau of Information as forwarded by Editor Baehr follows. The first chapter carries the answer to Question No. XII., and the second propounds three additional questions, Nos. XXII., XXIII. and XXIV. Editor Baehr, in explanation of the seeming disregard of regularity respecting the replies so far presented, makes all that plain in the following statement:

"It will be readily understood that some questions require much more time to answer than others. The Bureau has found that considerable study, and, in some cases, certain experimental work, have been necessary to enable the securing of information sufficiently accurate to answer certain questions. Other questions in turn are such that they can be answered more promptly. The result of this is that the order in which answers will be sent to the JOURNAL will not necessarily follow in numerical succession to the questions. The Bureau wishes to state to those of the gas fraternity who have submitted questions, or who are waiting for answers to particular questions, that their efforts are to make the Bureau's work careful and authoritative. The Bureau prefers to take ample time to secure the answer that will be careful and correct in every sense, rather than to make up a hasty, incomplete or unsatisfactory answer."

ADDITIONAL QUESTIONS.

Question No. XXIII.:

"Will you state the relative illuminating efficiencies of the 8-foot E. H. lava tip, the Sugg-D. Argand and the Carpenter burner, each consuming gas at the rate of 5 cubic feet per hour?

"(1). On coal gases of from 8 to 18-candle power.

"(2). On water gases of from 15 to 25-candle power; these candle power ranges being based on determinations with the 8-foot E. H. lava tip?"

Question No. XXIV.:

"Can you give the comparative results of any experiments as regards fuel economy, clinker prevention, and heat regulation, as well as other operating features, of the use of return flue gas as compared to preheated air and steam on any recuperative benches in any gas plant where the results would be viewed as being worthy of careful consideration?

"Give data if you will."

Question No. XXV.:

"What rule and method should be followed in designing condensers to remove condensation resulting from compression of gases?"

ANSWERS.

Question No. XII.:

"What effect has temperature on the revivification of purifying material: (1) As to the rate of revivification; and (2), the minimum temperature at which the chemical reaction will take place?"

Put in another form:

"What is the law of chemical reaction as regards temperature in the revivification of purifying material?"

ANSWER BY THE BUREAU OF INFORMATION.

On account of the present lack of knowledge of the law of revivification of purifying material, and owing also to the lack of exact experimental data, only a general answer can be given, which is borne out by the experience of various gas engineers. The generally accepted formula for revivification is:

$$2\,Fe_2S_3 + 3\,O_2 = 2\,Fe_2O_3 + 3\,S_2$$
$$12\,FeS + 9\,O_2 = 6\,Fe_2O_3 + 6\,S_2$$

These two chemical reactions take place with the generation of considerable heat. All purely chemical reactions are promoted by heat, and advantage is commonly taken of the heat evolved in the revivification reaction to promote the reaction itself by working the oxide in mass. If foul oxide be spread very thin and exposed to a low temperature, reaction will start, but will be greatly retarded, and continue feeble and slow, and in proportion as the temperature is allowed to increase the intensity of the reaction will increase, the safe limit of temperature to be allowed being found at a safe distance below the fusing point of sulphur, which is 239° F. Opinions of different men vary in this respect, and the upper limit is placed at from 100° to 180° F., the general trend of opinion seeming to point at 120° F. as the temperature at which revivification will progress most satisfactorily.

In regard to the minimum temperature at which revivification can be effected, it is stated that, if the oxide is in the open air and exposed to sunlight, it is an open question as to whether there is any minimum temperature in average practice. In sunlight, oxide will be revivified in freezing weather; indeed, the sun's rays are always a very important auxiliary in starting and continuing the most satisfactory revivification of the oxide.

When considering some hard-and-fast rule governing the relation of temperature to speed of revivification, it should be borne in mind that probably no two samples of purifying material are ever alike, and no one sample is ever the same at different exposures. The complete chemical reactions are in doubt, and about all that can be said is that revivification will always be more rapid and complete the higher, within reasonable limits, the temperature of the oxide. Therefore, the treatment should be such as to retain, as far as possible, in the material all the heat generated by the chemical reactions that occur, provided, of course, that this heat is not excessive.

From the information at hand the Bureau believes this subject to be one open for experimental determination, and desires to suggest this to anyone in the gas fraternity who may be able and willing to undertake such work. The Bureau wishes to call attention to the two answers received at large, which it recommends for careful consideration to all interested.

ANSWERS-AT-LARGE.

The first, by Mr. C. J. Ramsburg, Philadelphia, Pa., is as follows:

Upon removing the fouled oxide from the purifying box, the material consists, for the most part, of two substances – combinations of iron and sulphur—Fe_2S_3 and FeS. When these two are exposed to the oxygen of the atmosphere the following reactions take place:

$$2\,Fe_2S_3 + 3\,O_2 = 2\,Fe_2O_3 + 3\,S_2$$
$$12\,FeS + 9\,O_2 = 6\,Fe_2O_3 + 6\,S_2$$

It would seem a very simple matter, then, to take this material, spread it out and allow the action to proceed. In practice, however, there are some features of the procedure that are worthy of notice, and to which the writer of this question is evidently referring.

It is a well-known fact that Fe_2O_3 is a very poor purifying material, unless it contains water of hydration, and in proportion to the amount of this water in the molecule the activity of the material for the removal of hydrogen sulphide is greatly increased. If the temperature of the mass in revivification reaches a point at which this water of hydration is decreased, the activity of the material will fall off accordingly, and at 212° F. all of the water will be driven off. This marks the high danger limit in permissible temperatures during the revivifying process. Again, it is known that, if the temperature falls to near the freezing point, the chemical activity, by which the sulphide is converted into oxide of iron, is reduced to such an extent as to be negligible.

The best results from revivification are to be experienced when the oxide is not permitted to vary much from 90° to 120° F., under which circumstances the reaction will take place quickly enough not to make it necessary to keep the material out of the box too long, and that the ferric oxide formed will be in a high state of hydration.

With this knowledge in mind, the following points of good practice may be noted: Oxide should never be expected to revivify at a proper speed in a temperature below 60° F. It should be spread out, not piled up. It should be watched so that the temperature should not get over 125° F., at which temperature it should be subjected to liberal use of water.

It might be noted, in passing, that oxide which shows a very poor activity upon the first time it is placed in the boxes, often is much more active upon the second fouling, the reason for this being that what ferric oxide was affected by hydrogen sulphide in the first fouling became well hydrated in the revivification.

The second was sent in by Mr. Charles J. O'Donnell, of Philadelphia, Pa.:

I call your attention to the following question and answer which have been offered by the Trustees' Educational Fund; and while not exactly the same question yet it has some bearing along these lines:

Question.—"What is the influence of heat upon the chemical reactions that occur in the purifier, and what bearing does this influence have upon the question of the heating of purifying houses, lime rooms and revivifying sheds?"

Answer.—"The chemical reactions occurring in the purifiers between lime or ferric oxide and the sulphuretted hydrogen—and in the case of lime to carbonic acid also—in the gas, are rendered more rapid and complete by heat.

"It has been found that, at temperatures below 32° F., both CaO and Fe_2O_3 are practically inactive, with reference to H_2S; and that as the temperature increases, more and more of the impurities are absorbed, until, at temperatures of 100 to 120° F., the action becomes as complete as can be made under working conditions.

"It follows from this that, to secure good results in purification, purifying houses, lime rooms and revivifying sheds should always be maintained at a temperature not lower than 60° F., and further advantage may be derived from heating the gas itself, as it enters the purifiers, to a temperature of from 100° to 120° F."

Items of Interest
FROM VARIOUS LOCALITIES.

At the annual meeting of the Columbus (O.) Gas and Fuel Company, the officers elected were: H. D. Turney, E. K. Stewart, D. E. Putnam, G. W. Sinks, C. D. Firestone. F. C. Hubbard and W. E Hutton—Mr. Hutton succeeds Mr. J. R. Wilson, and is one of the noted financiers of Cincinnati; President, H. D. Turney; Vice-President, E. K. Stewart; Secretary and Treasurer, G. C. Scott. The earnings of the artificial gas plant operated by the Company in Columbus show quite an increase over those of last year, which is notable in that it is the first increase recorded therein for a number of years, or since natural gas got such a foothold in Columbus almost a score of years ago.

The new coal gas apparatus, the complete Pintsch gas plant and the 48-inch ammonia concentrator plant constructed by the Gas Machinery Company, of Cleveland, O., for the Chattanooga (Tenn.) Gas Company, are all in successful operation. The Gas Machinery folks are also under contract to erect a new 9-foot set of water gas apparatus for the Chattanooga Company, which will enable the latter to take care of the large increase in sendout.

At the annual meeting of the New London (Conn.) Gas and Electric Company, the officers elected were: Directors, Walter Learned, F. B. Brandegee, Carlos Barry, B. P. Learned, W. G. Bushnell, A. H. Young and M. J. Warner; President, W. Learned; Vice-President, B. P. Learned; Treasurer, M. J. Warner; Secretary, A. J. Campbell.

Mr. B. R. Laraway, who resigned the position of General Manager of the Pontiac (Mich.) Light Company, to assume a corresponding position in the Jackson (Mich.) Gas Company, has been succeeded by Mr. Frank M. Carroll.

"A. W.," writing from Spokane, Wash., under date of the 9th inst., incloses the following: "One million dollars is the stated capital of the Northwest Light and Water Company, with headquarters at Carson City, Nev., articles respecting the incorporation of which were filed a few days ago. The incorporators are Robert E. Strahorn, of Spokane, President of the North Coast Railway Company; A. G. Smith, B. J. Danson and E. D. Doyle. It is generally believed at Wallace and Spokane that the water and light plants at North Yakima, Wash, Wallace, Idaho, and Sumpter, Ore., will be consolidated. The owners of the Wallace plant are known to control the others mentioned, and it is believed that the filing of the articles of the Northwest Light and Water Company is simply an initial step towards the merging of those interests."

Some days ago City Comptroller Nolan received a check from the Evansville (Ind.) Gas and Electric Light Company amounting to $1,830.72, which sum represented the annual tax of 5 per cent. upon the gross receipts of the Company from motive power furnished its consumers. Last year the payment on like account was $1,454.15.

The Lynn (Mass.) Gas and Electric Company will have completed the work of piping up the adjoining district of Lynnhurst on or before July 1st.

"T. L.," writing under date of the 4th inst., from Minneapolis, Minn., says that on the 4th inst.. one Joseph Hlavack, proprietor of the Grand Central Hotel, pleaded guilty before Judge Simpson to a charge of grand larceny. He was given the maximum penalty that could be imposed—90 days in the county jail. He was charged with the larceny of 284,000 cubic feet of gas, by means of a surreptitious connection, said gas having been used to keep up the hot water circulatory system by means of which his hotel was heated.

Mr. Robt. Weiss, of Los Angeles, Cal., has been granted a franchise to pipe the settlement of Ontario, Cal., for a gas supply.

Mr. W. H. Miller has been elected Secretary of the Bay State Gas Company, to succeed John F. Donahue, resigned. There is some sort of a stew simmering in the Bay State pot, and the vapors arising from the stewing are not pleasing to the nostrils.

Here is a straw from the testing records of the Public Service Commission, Southern District of New York, for April: Total meters tested, 30,799, of which 7,488 were new, 22,640 were repaired and 651 were meters tested on complaint of consumers. Of the latter, 76 were found accurate; 361 were fast; 214 were slow. The average percentage slow was 2.86; average percentage fast, 2.82. Of the slow meters the highest error was 26 per cent., on an average consumption of 9,000 cubic feet per month; highest percentage fast, 12.42, on an average monthly consumption of 4,200 cubic feet.

The Minneapolis Gas Light Company, of Minneapolis, Minn., has purchased a plot of 3 acres of land, near the Northern Pacific Company's tracks, on which to construct a plant for the better supply of the northeastern section of the city.

Mr. M. E. Malone, Superintendent of the gas division of the trading of the Denver (Col.) Gas and Electric Company, is enjoying a vacation this spring, during which period he will visit the old city of Mexico and thence to Vera Cruz, to Havana and other points in

Cuba. The home journeying will be by way of Key West, Tampa, New Orleans and Galveston. His health has not been of the best, and the trip is taken with the object of restoring it, which result we hope will be gained to the full.

"V. R. M.," writing from Milwaukee, Wis., under date of the 8th inst., incloses the following: "An extremely interesting use for motor cycles has been planned by the Milwaukee Gas Light Company, which has been of good service to the consumers as well as to the Company. With the monthly bill the Company sends out a postal card showing the free service the Company undertakes for its patrons, which service has to do with the adjustment of range burners, gas mantle burners, hot water heaters, etc., all of which come in the province of the housekeepers. When the help of the Company's experts is needed the troubled one drops the card into the nearest letter box. From 10 to 3 times that number of cards come in the Company's mail each morning, and these are assorted, and a batch is given to each of the six members of the mounted squad for immediate attention. An appropriate uniform, with badge, of course, goes in the equipment of the motorist."

THE Evansville (Ind.) Company is now comfortably housed in its handsomely equipped quarters, in the building on Second and Sycamore streets, formerly occupied by Parsons and Scoville. The structure was remodelled to comply with the Company's needs.

MESSRS. BROWN and Sutherland, of Canandaigua, N. Y., have secured a franchise from the authorities of Wheatland, N. Y., for the right to distribute gas in the village of Mumford. It is intended to distribute natural gas, but the franchise enables them to deal in artificial gas as well.

DURING the month of April the Syracuse (N. Y.) Bureau of Gas and Electricity, according to Superintendent Blakslee's report the number of "outages" in the public lamp service of that city equalled 1.46 per cent, of the service. During the same month, with reference to gas and electric meter testing, Mr. Blakslee says: "Beginning with April, we started a regular test of gas meters at the meter shop of the Syracuse Lighting Company, and during the month have tested 1,077 meters. Of these 922 were found correct and badged; 69 found slow; 73 found fast, and 13 leaky or otherwise out of order. There have been no gas or electric meters tested on complaint during the month."

MR. H. HOWARD SMITH, of Philadelphia, Pa., has been appointed Superintendent of the Bath (N. Y.) Gas and Electric Light Company, vice Mr. John W. Rich, who resigned to go in business on his own account in Washington, D. C.

DR. CHARLES JOHNSON, formerly Manager of the Ottawa (Ills.) Gas Company, has been appointed to control all the gas interests of the Dawes syndicate.

MR. ROBERT M. SEARLE, General Manager and Engineer-in-Chief of the Rochester (N. Y.) Railway and Light Company, has awarded to the United Gas Improvement Company a contract for the construction of a standard, double-superheater set of Lowe water gas apparatus, up to a daily manufacturing capacity of 3,000,000 cubic feet. This set will be of the latest design, and will include all the auxiliary appliances, several of which are of recent invention and adoption by the U. G. I. Company, and all of which go to make the maximum of efficiency and economy of operation. It is interesting here to note in this connection that, with the exception of Philadelphia, this installation will give to Rochester the largest unit of water gas apparatus in the world. The Philadelphia sets are also of the Lowe type, as designed and installed by the U. G. I. folks.

THE Kerr Murray Manufacturing Company, of Fort Wayne, Ind., has been awarded the contract by the Waterloo (Ontario) Board of Light and Water Commissioners for the furnishing of a single lift holder having a storage capacity of 50,000 cubic feet.

THE Washington Water Power Company, of Spokane, is negotiating for the overflow privileges on 6,000 acres of lowlands in the Coeur d'Alene reservation on the St. Joe and St. Maries rivers in northern Idaho. Surveyors have been working along these rivers since the first of the year, and the preliminary survey is nearly completed. The overflow of these lands is occasioned by the dam at Post Falls, Idaho, where one of the large lighting plants is now in operation. The level of the Coeur d'Alene lake has been raised 3 feet above the normal stage by the dam, and the backwater thus occasioned has covered thousands of acres along the Coeur d'Alene, St. Joe and St. Maries rivers. Arrangements have been made with the settlers along the Coeur d'Alene river, for the purchase of land thus affected by the backwater. Options covering nearly all of this land have been secured by the Company and many of them taken up. In numerous instances easement for overflow only is secured, while in others the Company purchases the land direct.

"L. G." sends the following, from Richmond, Va., under date of the 9th inst.: "Scores of wreckers, in the employ of the Stacey Manufacturing Company, of Cincinnati, O, are hard at work demolishing (rather tearing apart) the large holder at the lower station of the Richmond (Va.) municipal gas works, with a view to remodelling the tank to confine a larger storage vessel. The holder, which was quite a huge one in its day and time, was constructed in 1872, by William E. Tanner, a contractor whose name in that time was a household word with gas makers. The capacity of the holder was 400,000 cubic feet."

L. D. KEASBEY, of Boston, Mass., sends the following: "The refusal of the Salem (Mass.) Gas Light Company to put in practice the order of the Board of Gas and Electric Light Commissioners fixing a maximum selling rate of $1.10 per 1,000 cubic feet in Salem was voiced on the 6th inst., when the Company appealed to the United States Circuit Court for an order to have the order nullified. On December 24, 1906, the officials of Salem and Peabody joined in a petition to the Board of Gas and Electric Light Commissioners for a decree ordering a reduction in the gas rate to $1.10 per 1,000, from $1.20 per 1,000. In the end the Commission so decided, and the Company in its plaint to the Court specifies: That at $1.10 per 1,000 the sales for 1908 would yield but $141,338, or $36,946 more than the net cost, or less than 5½ per cent. on the actual value of the property employed in the business of the Company, and this without considering a reserve or depreciation on the mains, plant, etc. The charge for reserve it is claimed should not average less than 5 per cent., and for depreciation in mains 3½ per cent. This would reduce the balance of net earnings to $9,397, which would be only about 2.69 per cent. on the par value of the stock of the Company and only ¼ of 1 per cent. on the value of the property actually used by the Company in producing gas. The value of the Company's property is placed at $673,000, exclusive of goodwill. The plaintiff, therefore, claims that the reduction in the selling price of gas would deprive it of its property and that the Commissioners have no right to pass an order which would have such an effect."

THE proceedings at the annual meeting of the Cincinnati Gas and Electric Company resulted in the election of the following officers: Directors, M. M. White, S. R. Burton, C. L. Work, J. T. Carew, C. P. Taft, B. S. Cunningham, M. E. Moch, L. J. Hauck, C. H. Rowe, N. G. Kenan, C. L. Harrison, N. S. Keith, J. B. Foraker, Jr., R. A. Holden and C. H. Davis; President, C. P. Taft; Secretary, Theo. Clauss.

"T. L. B.," writing from Chicago, under date of the 12th inst., incloses the following, and in his letter further says: "I would like to know if this is not the sort of procedure which brings wrath upon the heads of those in the gas business, and I would further like to hear from anyone save those in charge of the Mattoon job, in defense of the procedure?" The clipping inclosed by our correspondent, which seems to have been taken from the Mattoon *Gazette* of the 5th inst., is as follows: "Because C. W. Brewer refused to pay for a gas meter which was damaged in the fire which destroyed his home at 108 South Ninth street about a week ago, the Mattoon Gas Light and Coke Company filed an attachment suit in Judge Scott's court restraining O. T. Harroun from paying to Brewer the sum of $8 said to be due Brewer for a gas stove bought from the latter shortly after the fire. The suit is for $10. It seems that the application for gas which the Company requires consumers to sign before it will supply them with the fuel contains a clause by which the consumer binds himself for any damage done a meter while in his possession. Brewer signed this application. After a settlement with the insurance company Brewer sold part of his household goods, among which was a gas stove, to O. T. Harroun, a 'Big Four' machinist. The Gas Company then tried to force payment for the meter, and when this was refused it secured an attachment for the money while it was in Harroun's hands." It seems to us that the only fair claim to be reimbursed on the part of the Gas Company, considering the peculiar way it set out to recover the money, would lie in the knowledge that, in his insurance settlement, Brewer had included the value of the meter as a chattel of his own. Otherwise, the proceeding certainly has a dubious appearance.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance, Single copies, 10 cents.

The JOURNAL is the official organ of the NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand anytime of Wednesday.

MONDAY, MAY 19, 1908.

The Market for Gas Securities.

Consolidated held strong all week, and the opening this morning (Friday) was 121¼ to 122, or a gain of 2½ points over that of last week. This "high" figure is surely a ridiculously low one. The bond market remains active, but prices even in accredited city issues are all in favor of the investor.

Peoples, of Chicago, is well beyond the 90 mark. It opened to-day at 92 bid; it should be at least par and 20. The Massachusetts gas issues are strong, the common being traded in above 54. The officers elected at the Bay State special meeting were: President, T. W. Lawson; Vice-President, J. F. Allen; Secretary and Treasurer, W. H. Miller. How's that for a trinity?

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks,

16 WALL STREET, NEW YORK CITY.

MAY 18.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	121¼	122
Central Union Gas Co.—				
1st 5's, due 1928, J. & J.	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual	3,500,000	100	130	160
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	92	96
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	105
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	125
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	108	120
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91¼	92
Yonkers	200,000	500	120	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1	1 1-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	2,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	89	89½
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	87	88
Preferred	3,038,500	100	81	82
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,000,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 5's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated, Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	—	—	74½	75
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	281,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Lt. Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	10	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	98
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	—	100
Preferred	2,500,000	100	80	10
Bonds	10,000,000	1,000	104	104½
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	54	54¼
Preferred	25,000,000	100	85	85¼
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	127	133
New Haven	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	24,000,000	100	91¾	92
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Elec. Co.	2,120,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco, Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¾	—
Syracuse, N. Y.	1,378,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington, D. C.	2,600,000	20	346¾	353
1st Mortgage, 6's	600,000	—	—	—
Western, Milwaukee	4,000,000	—	—	—
Wilmington, Del.	600,000	50	230	—

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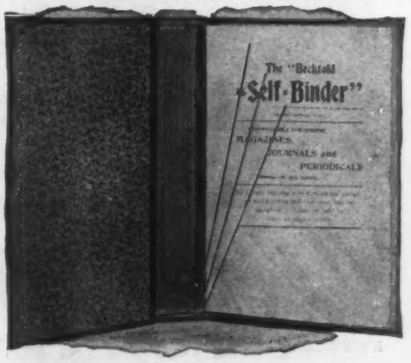

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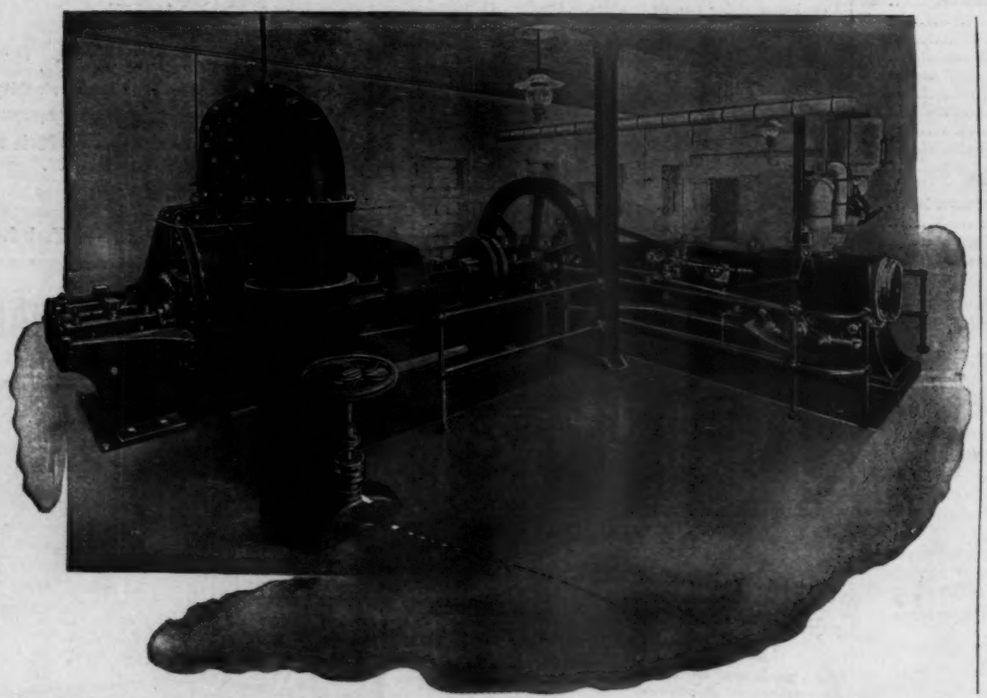

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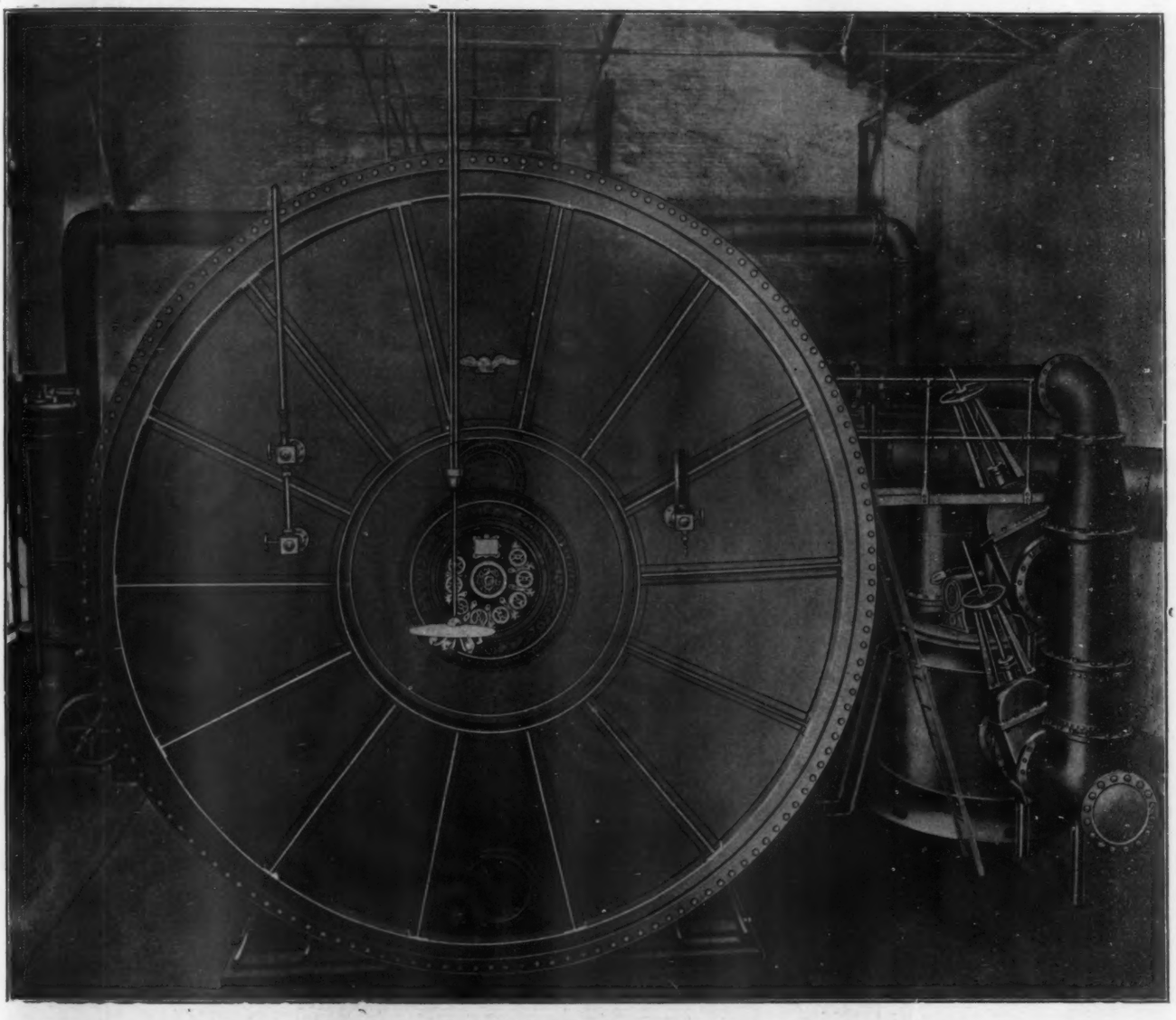

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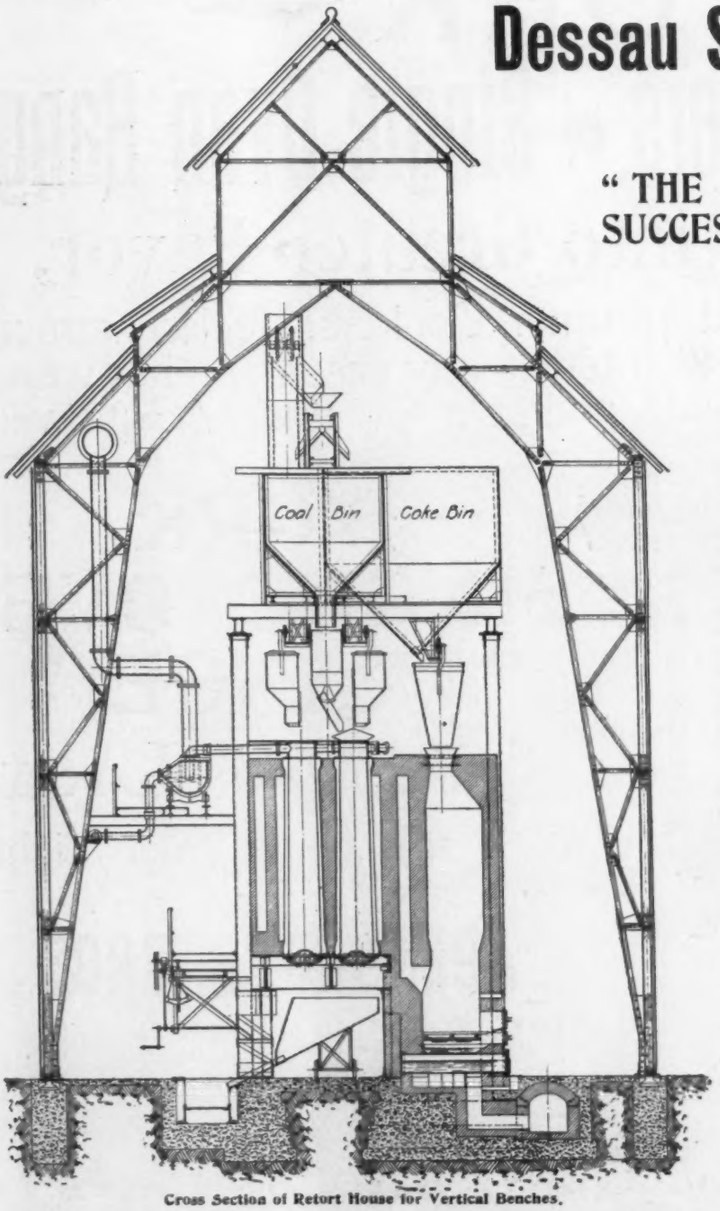
PACIFIC COAST AGENTS: Hallidie Machinery Co., Seattle, Wash.

WATER GAS WORKS.

THE GAS MACHINERY CO.
CLEVELAND, OHIO.

Dessau System of Vertical Retorts.

"THE ONLY SYSTEM IN SUCCESSFUL OPERATION."



Cross Section of Retort House for Vertical Benches.

- Nineteen Installations with 126 Benches in operation.
- Eight Installations with 57 Benches in course of construction.
- Maximum gas produced per man per 24 hours, 360,000 cu. ft.
- Ten per cent. increase in yield of gas.
- Forty per cent. increase in yield of ammonia.
- Best quality of coke.
- Least percentage of breeze.
- Low fuel consumption.
- Tar produced low in carbon.
- Extreme low cost of retort house labor.
- Minimum expense in wear and tear.
- No Naphthaline.
- No Cyanogen

Present Producing Capacity, 25 Million Cu. Ft.

WHY NOT OBTAIN SIMILAR RESULTS AND INCREASE

YOUR EARNINGS?

ALL RESULTS GUARANTEED.

WE SOLICIT YOUR INQUIRIES!

DIDIER-MARCH COMPANY,

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Low Priced Cookers and Single Oven Ranges

Are Coming into Greater Favor,

And the new line of 3 and 4-burner Cookers, steel construction, with or without broiler, will interest any gas man that wants a fine looking article, well made, and at a low price. Cuts will be shown in a later issue.

YORK SINGLE OVEN RANGE,

$16.00 List,

With the Open Door Lighter.

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ABENDROTH BROS.,

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WE CAN MAKE QUICK DELIVERY OF YOUR ORDERS FOR

Atlantic Tubing Company's Gas Tubing.
Humphrey's Crescent Bath Water Heaters.
Staple Gas Brackets—Rope, Square, Vine, Etc.
Special Turned Brackets—*the finest line made.*
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With the Largest Capacity at the Lowest Price.
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SELLING AGENTS FOR ALL GAS APPLIANCES.

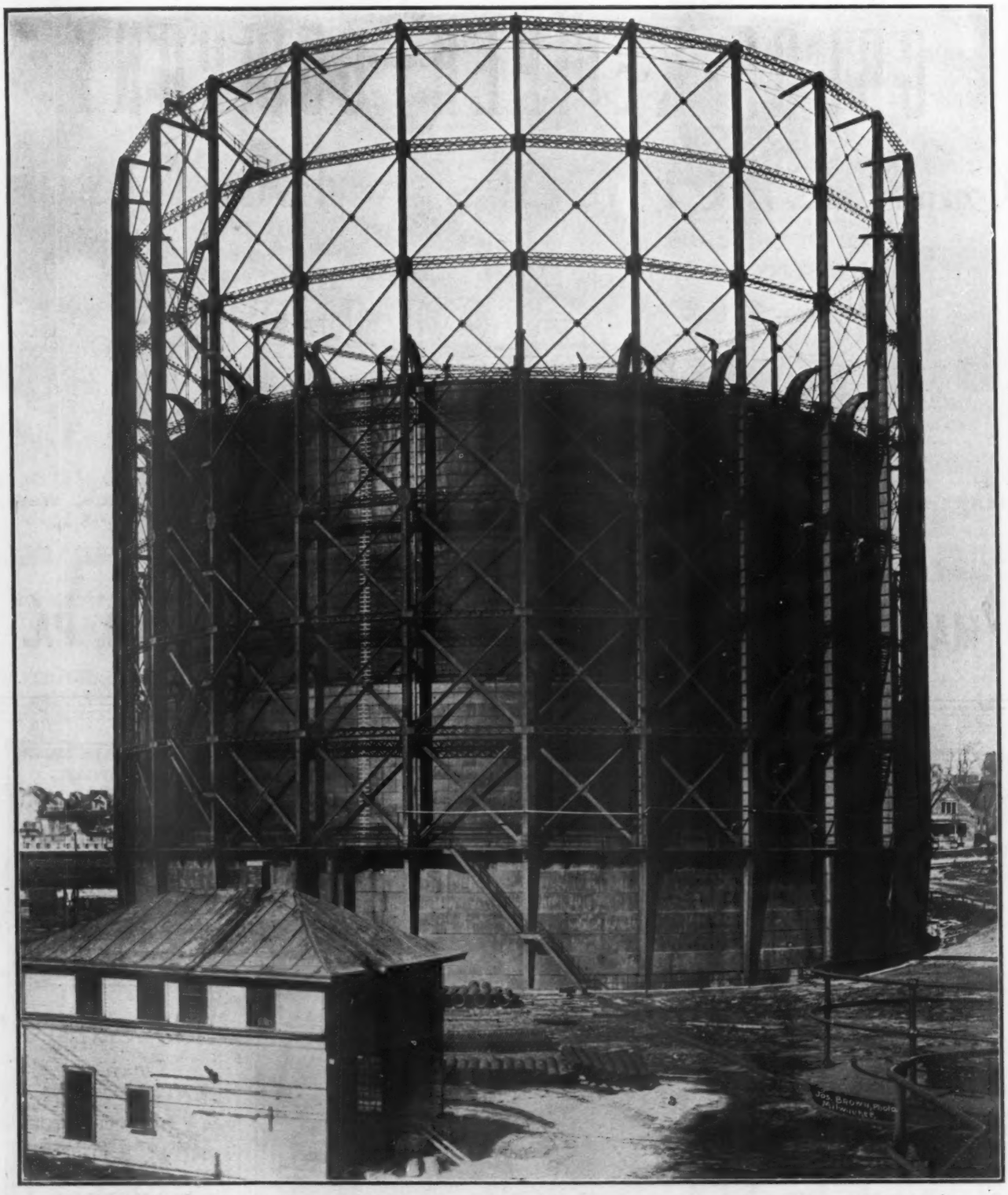

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PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

COMPLETE COAL GAS PLANTS.

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PRIMARY AND SECONDARY CONDENSERS FOR FRESH OR SALT WATER

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SHAVING SCRUBBERS PURIFIERS STREET GOVERNORS

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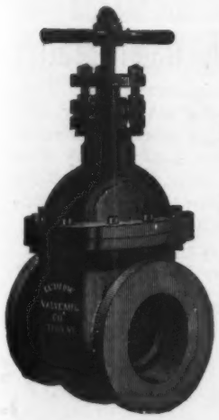

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Double and Single Gate Valves, ¼" to 72",

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Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

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Complete Works Erected.

FREDERICK W. FLOYD, Engineer.

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Manufacturers of

High Grade Firebrick, Blocks, Tiles,

ETC.,

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RECORDING INSTRUMENTS for PRESSURE, TEMPERATURE AND ELECTRICITY,

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THE WM. H. BRISTOL

Electric Pyrometers

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Special Indicating and Recording Pyrometer Outfits for

WATER GAS MACHINES.

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ELECTRIC GAS LIGHTING.

How to install electric gas igniting apparatus, including the jump spark and multiple systems for use in houses, churches, theaters, halls, schools, stores or any large building. Also, the care and selection of suitable batteries, wiring and repairs.

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BEST IN THE WORLD.

Humphrey Instantaneous Bath Water Heaters

Should be used in every home. They make Hot Water **always** ready. Require no attention after installation. Hot water pours forth at any time upon lighting the gas. Close off the gas and all expense ceases. **Absolutely Guaranteed.**

Special Merits.

A burner that won't light back; a **rust proof** enameled shelf; a removable base plate for ready access to burner.

Shall we Send Catalog No. 9 and Discounts?

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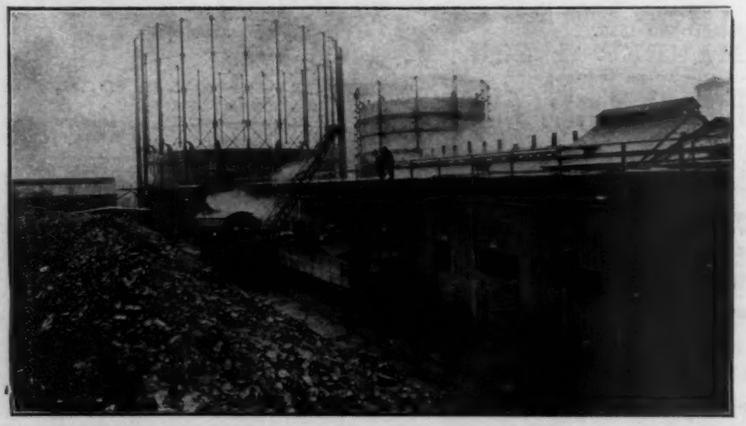
Kalamazoo, Mich., U. S. A.



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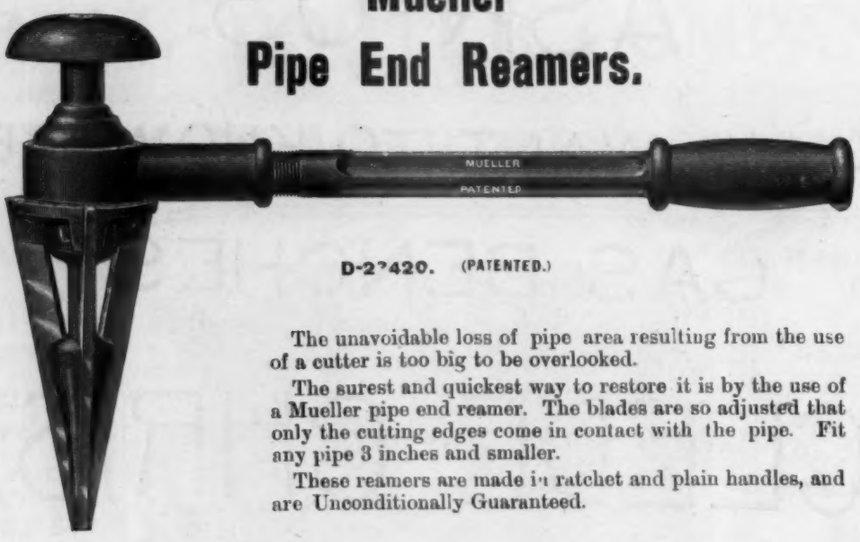
Mueller Pipe End Reamers.



D-2?420. (PATENTED.)

The unavoidable loss of pipe area resulting from the use of a cutter is too big to be overlooked.

The surest and quickest way to restore it is by the use of a Mueller pipe end reamer. The blades are so adjusted that only the cutting edges come in contact with the pipe. Fit any pipe 3 inches and smaller.

These reamers are made in ratchet and plain handles, and are Unconditionally Guaranteed.

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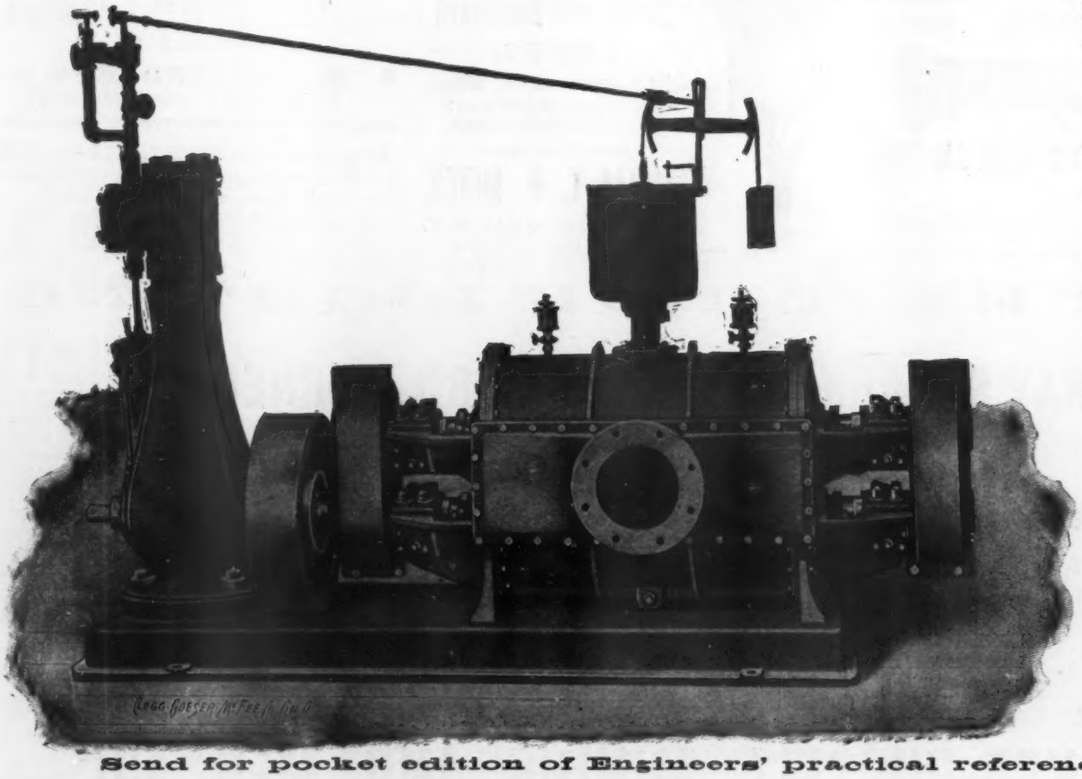

Sizes for any required capacity.

Self-oiling, adjustable bronze bearings.

Most perfect and sensitive Governor.

Write for Catalogue.

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To insure maximum illumination with Humphrey Arc Lamps, we took up the manufacture of Arc Mantles.

Our sole aim is to produce the highest efficiency with Humphrey Gas Arc Lamps.

It seems to be up to us to set the standard in mantles as well as lamps.

We are now in a position to fill arc mantle orders promptly.

GENERAL GAS LIGHT COMPANY,

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MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

"THE MINER"

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THOUSANDS IN USE WITH INCANDESCENT BURNERS.

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Practical Photometry,

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Price, ... $3.00.

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A. M. CALLENDER & CO.,

42 Pine St., New York City.

STANDARD REDUCTION FACTORS for GASES,

By Helon Brooks MacFarland, B.S., M.M.E.

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FOR EXTERIOR LIGHTING

— USE —

Bray's Special Burner.

BRAY'S MARKET OR STANDARD BURNERS.

For Markets, Meat Shops, Fruit Stands, Show Windows, Street Lamps, and all places where high candle power is required.

These Burners Give a Large, Well-Shaped Flame.

They are Very Durable and Can be Depended Upon to Give Satisfactory Service for Years.

Market burners can be furnished in Nos. 8 and 9. The Jumbo burner is 30-candle power size.

Prices on Application.

W. M. CRANE COMPANY, NEW YORK, Sole Agents U. S. and Canada.

Bray's Standard Jumbo.

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GAS RETORT BENCHES, STOKING MACHINERY, STAND-PIPE CLEANER AND STRAIGHT STAND-PIPE SYSTEM.

GAS RETORTS AND FIREBRICK.

We Manufacture Gas Retorts and Settings, Furnace Blocks and Fire Clay Tiles of Every Description.

Benches.--We erect GAS RETORT BENCHES with Horizontal retorts having closed ends up to 10 feet in length, or Through retorts up to 20 feet in length.

Slopers.--Also, SLOPERS on improved lines for Inclined Retorts.

Stoking Machinery.--Sole Agents for U. S. and Canada for the Fiddes-Aldridge Simultaneous Discharging Charger. The "F. A.," or "One-Stroke" Machine. Cost of Carbonizing reduced to minimum. No Dust. Silent. No Waste of Coal. No Injury to Retorts.

Water Gas Linings.--We make a specialty of WATER GAS BLOCKS, and supply brick of superior grade for checkerwork.

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Retort Houses and Conveying Machinery.--We also build Retort Houses, Coal and Coke Conveying Machinery. Plans, specifications and estimates cheerfully furnished.

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AMERICAN METER CO.,

NEW YORK, ST. LOUIS, PHILADELPHIA, SAN FRANCISCO, CHICAGO,

Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

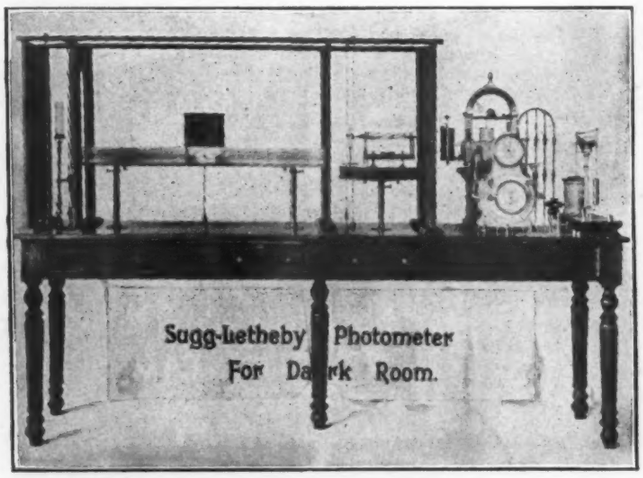
JUNE, 1908.

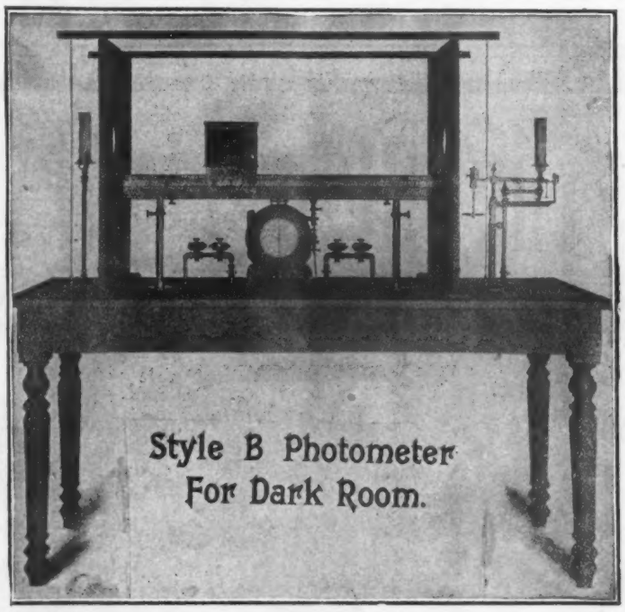
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.
Mon.	1	7.50 PM	3.30 AM
Tue.	2	7.50	3.30
Wed.	3	10.20	3.30
Thu.	4	10.50	3.30
Fri.	5	11.20	3.30
Sat.	6	11.50 FQ	3.30
Sun.	7	12 20 AM	3.30
Mon.	8	12.40	3.30
Tue.	9	1.10	3.30
Wed.	10	1.40	3.30
Thu.	11	2.10	3.30
Fri.	12	2.50	3.30
Sat.	13	No L.	No L.
Sun.	14	No L. FM	No L.
Mon.	15	No L.	No L.
Tue.	16	8.00 PM	10.50 PM
Wed.	17	8.00	11.40
Thu.	18	8.00	12.20 AM
Fri.	19	8.00	1.00
Sat.	20	8.00 LQ	1.30
Sun.	21	8.00	2.00
Mon.	22	8.00	2.20
Tue.	23	8.00	2.50
Wed.	24	8.00	3.20
Thu.	25	8.00	3.30
Fri.	26	8.00	3.30
Sat.	27	8.00	3.30
Sun.	28	8.00 NM	3.30
Mon.	29	8.00	3.30
Tue.	30	8.00	3.30

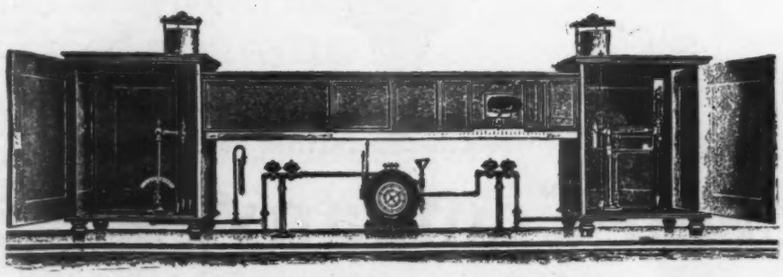
TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs. Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

JUNE, 1908.

Day of Week.	Date.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A. M.
Mon.	1	7.12	3.17
Tue.	2	7.12	3.17
Wed.	3	7.12	3.17
Thu.	4	7.17	3.12
Fri.	5	7.17	3.12
Sat.	6	7.17	3.12
Sun.	7	7.17	3.12
Mon.	8	7.17	3.12
Tue.	9	7.17	3.12
Wed.	10	7.17	3.12
Thu.	11	7.17	3.07
Fri.	12	7.17	3.07
Sat.	13	7.17	3.07
Sun.	14	7.17	3.07
Mon.	15	7.17	3.07
Tue.	16	7.17	3.07
Wed.	17	7.17	3.07
Thu.	18	7.22	3.07
Fri.	19	7.22	3.07
Sat.	20	7.22	3.07
Sun.	21	7.22	3.07
Mon.	22	7.22	3.07
Tue.	23	7.22	3.07
Wed.	24	7.22	3.07
Thu.	25	7.27	3.07
Fri.	26	7.27	3.07
Sat.	27	7.27	3.07
Sun.	28	7.27	3.07
Mon.	29	7.27	3.07
Tue.	30	7.27	3.07

TOTAL HOURS DURING 1908.

	Hrs. Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguishing time	30.30
Total, yr.	3962.05

NEW YORK, 318 West 42d Street.
BOSTON, 820 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, 218 La Salle Street.
SAN FRANCISCO, 512 Oak Street.

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....OF AMERICA....

No. 36.

Controls and Operates the **Welsbach System of Street Lighting,**

Which includes its specially DESIGNED and PATENTED BURNER for PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

The Chic Light.

ONE OF THE MOST POPULAR AND BEST SELLERS OF THE WELSBACH LINE.

For decorative appearance and large volume of light at a popular price to the consumer,

THE CHIC LIGHT

is practically alone in the field. Complete satisfaction to the user is its strong point.

THE CHIC LIGHT—Design No. 71310.

PRICES:

Boxed complete, with No. 71 Welsbach burner, No 310 F. Q. M. cylinder, No. 196 Junior J Brand Welsbach mantle, including the No. 316 opal shade, which will be packed separately.

Price, complete, clear cylinder, each, dozen lots, ... $1.35
Price, complete, clear cylinder, 100 lots, each, ... 1.25

When supplied with **No. 310 F. Q. M. Opal Cylinder** add 10 cents to above list.

Price of Shade No. 316.
Package Contains 10 Dozen.

Price, per dozen, ... $4.40
Price, original package, per dozen, . 4.00

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Salesrooms in all Leading Cities of the United States.

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Broad and Arch Streets, Philadelphia.

LESSEES, OPERATORS AND BUILDERS OF **GAS WORKS.**

Largest Builders of CARBURETTED WATER GAS PLANT IN AMERICA.

SOLE AMERICAN BUILDERS

OF THE

Standard Double-Superheater Lowe Water Gas Apparatus.

1907 CONTRACTS.

PARTIAL LIST OF PLACES:

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Winsted, Conn. (2d contract).
Nashua, N. H.
Augusta, Me. (2d contract).
Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schenectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfolk, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.
Arlington, Mass.

TOTAL SETS INSTALLED DURING YEAR, ... 43
TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
Gas Analysis Apparatus.
Recording Gauges.
Straight Standpipe System for Coal Gas Retorts.
Straight Standpipe Cleaners.
Waste Heat Boiler.
Hygrometer.
Venturi Meter for Measuring Flow of Air Blast.

Established 1858. Incorporated 1890.
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H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

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CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

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ESTABLISHED 1868.

L. N. RANCKE, Vice-Pres. & Mgr. F. SCHIAFFINO, Sec'y & Treas.

BALTIMORE RETORT & FIREBRICK CO.

BALTIMORE, MD.,

Manufacturers of all Material for the Construction of Coal Gas Benches.

HALF AND FULL DEPTH AND FREE FIRING BENCHES,

All styles of which we have in operation, equipped with the BEST of LATEST IMPROVEMENTS, proving our claim for SUPERIOR QUALITY and EFFICIENCY.

INCLINES—We have in SUCCESSFUL OPERATION benches of Inclined Retorts, MANUFACTURED and ERECTED by us.

WALDO BROS., 102 MILK ST., BOSTON, MASS.,
Agents for New England States.

LARGE FACILITIES—Correspondence Solicited.
RAIL and WATER CONNECTIONS to ALL POINTS.

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GAS BENCH CONSTRUCTION COMPANY,

METROPOLITAN BUILDING, ST. LOUIS, MO.,

Engineers and Builders of all styles of Standard and Special Benches from one to twelve Retorts, Horizontal, Vertical, or Inclined.

We will guarantee "Better Benches," to be easier to control, make more gas per retort, and operate with less fuel than any bench on the market.

ALL WORKMANSHIP AND MATERIAL GUARANTEED.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** *The* **Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One to Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

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PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEO. M. RICHMOND, M.E. Price, $1.00.
For Sale by A. M. CALLENDER & CO., 42 Pine St., New York City.

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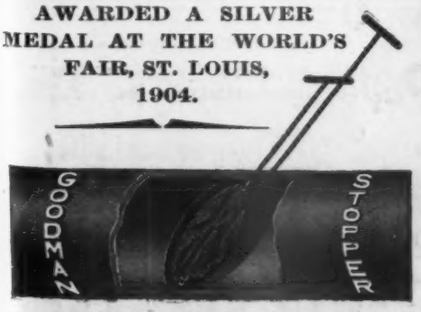

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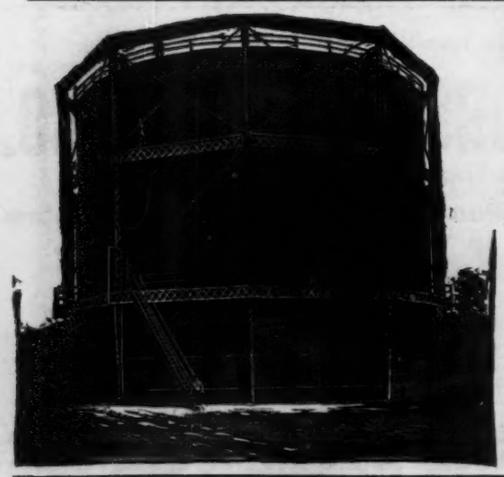

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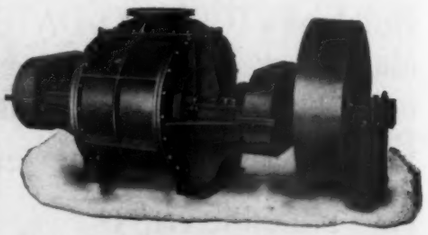

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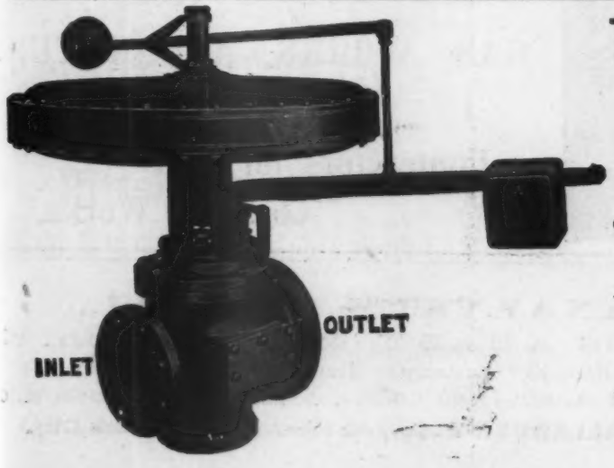

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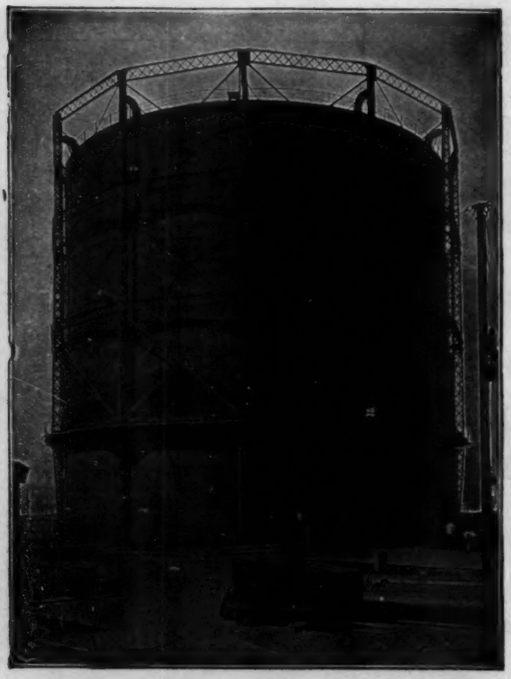

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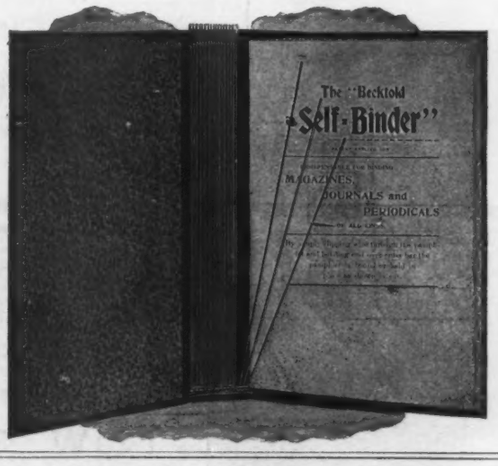

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